

SERVICE MANUAL

STEREO TURNTABLE

**SANYO****PLUS Q60**

SPECIFICATIONS

NOTE : Parts mentioned in the following list vary in Part Number according to Territories.

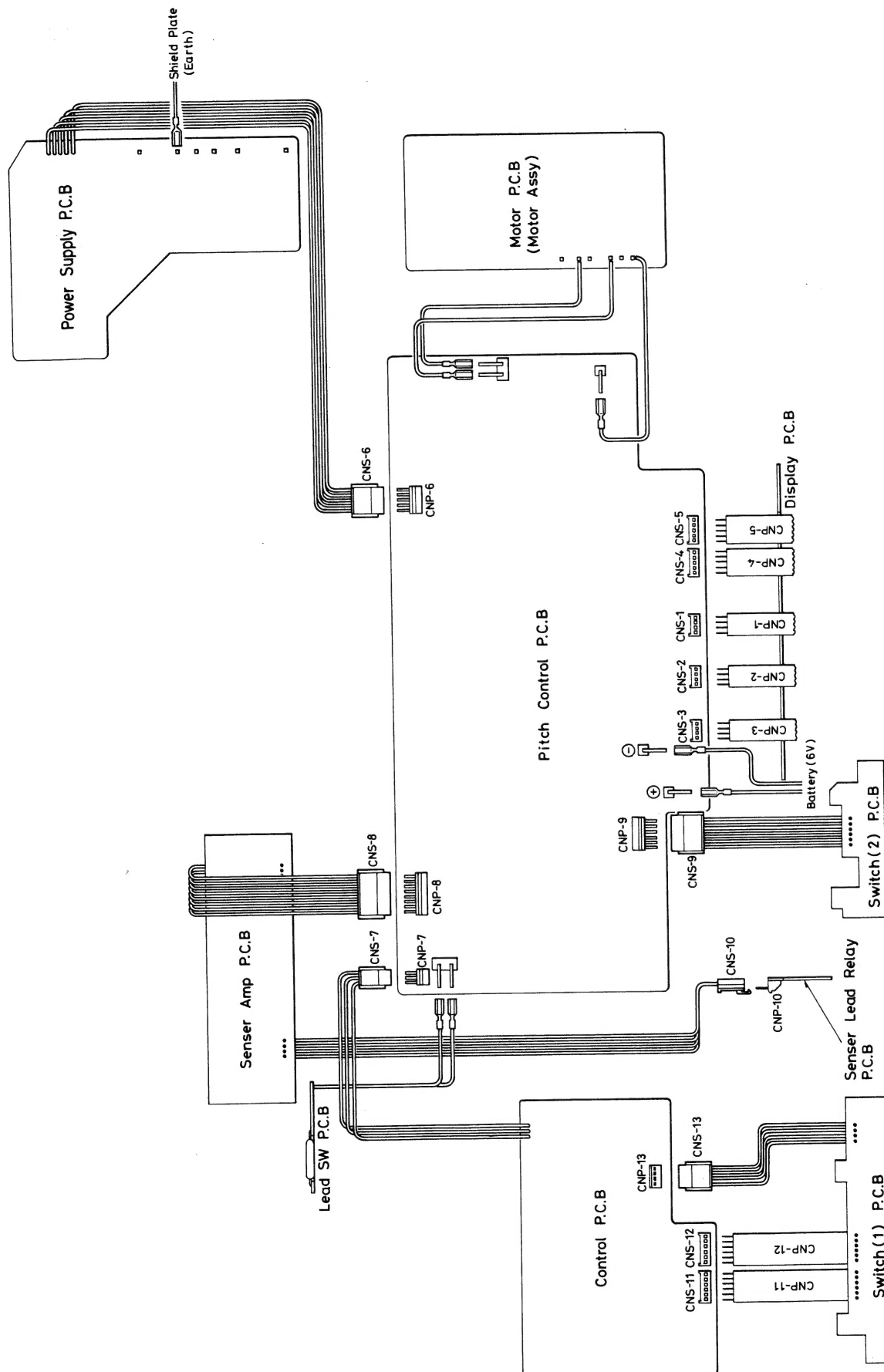
Motor	Quartz PLL brushless servo motor (turntable platter) DC motor (tone arm)	Tracking error	$\pm 1.5^\circ$
		Overhang	15 mm
Drive system	Direct drive/Full auto	Frequency response	20 – 20,000 Hz
Speed	33-1/3 and 45 rpm	Channel separation	Better than 25 dB
Wow and flutter	Less than 0.025% WRMS	Power source	AC: Local Voltage
Rumble	–73dB DIN B spec	Power consumption	17 W
Turntable platter	312 mm (12-1/4"), 1.5 kg (3 lbs. 3 ozs.)	Dimensions (Approx.)	440(W) x 372(D) x 154(H) mm (17-1/4" x 14-5/8" x 6")
Tone arm	Static-balance type (Carbon fiber)	Weight (Approx.)	9.5 kg (20 lbs. 14 ozs.)

* Specifications and design are subject to change without notice.

NOTE:

* To lubricate the turntable, please consult your nearest SANYO agent.

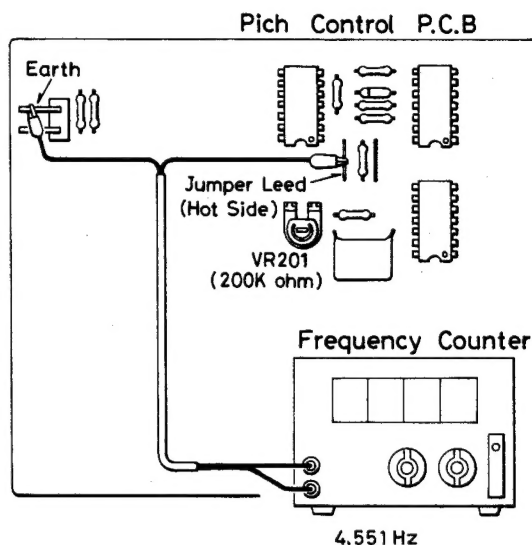
CONNECTION CHART



CIRCUIT ADJUSTMENT

1. Adjustment of Reference Oscillator

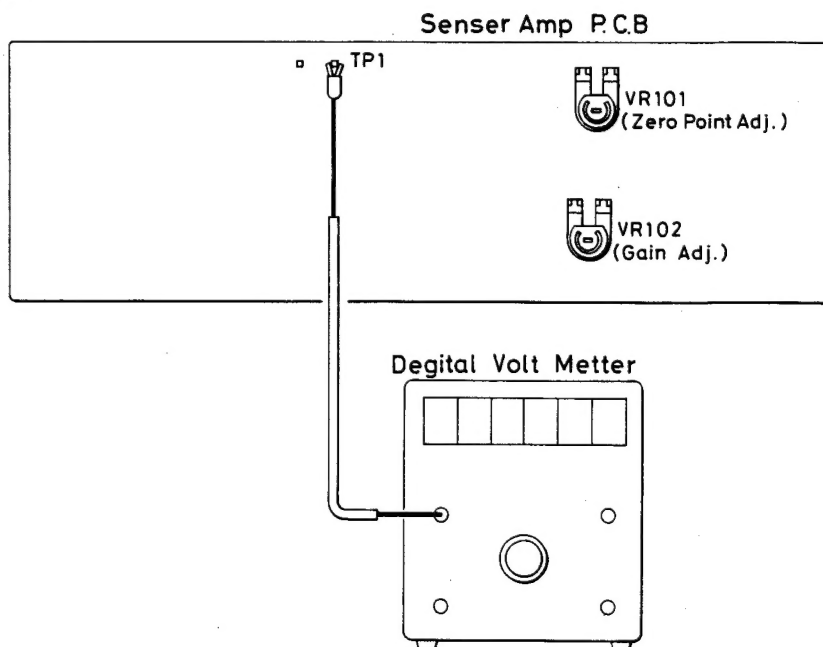
- * Connect the measuring terminals of the frequency counter to the test point (see the attached figure) of the pitch control PCB.
- * Turn ON the power switch of the set. Next, adjust the semi-fixed volume (variable resistor) VR201 (200K ohm) to set it with the following frequency: Adjusting frequency: 4.546 ~ 4.556Hz (Center frequency: 4.551Hz)



2. Adjustment of Stylus-force Gauge Sensor Amplifier

Note 1: Turn ON the power switch of the set to keep the set in the energized state for ten minutes.

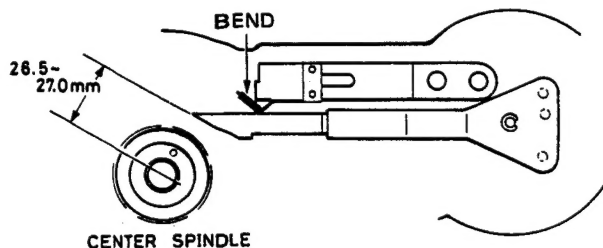
- * Connect the digital voltmeter to the interval between the test point TP-1 and earth of the sensor amplifier PCB. (See the attached figure.)
- * Adjust the semifixed volume (variable resistor) VR101 (20K ohm) to set the indicating value of the digital voltmeter to 0.000V. (Adjustable to within the range of indicating value $\pm 0.005V$) (Zero-point adjustment)
- * Place a weight (1.5g) provided to the set on the needle pressure gauge, and adjust the semifixed volume (variable resistor) VR102 (10K ohm) so that the needle pressure indicating value of the set will become 1.5g. (Gain adjustment)
- * Remove the weight, and read the indicating value of the digital voltmeter. If this value is found within $\pm 0.005V$ range, adjustment is over.
- * However, if found outside of $\pm 0.005V$ range, perform adjustment again from zero-point adjustment of the second step.



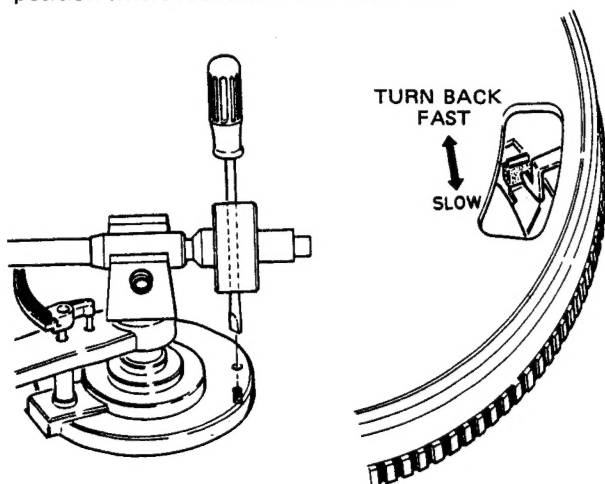
MECHANISM ADJUSTMENT

ADJUSTMENT OF AUTO-RETURN

1. Adjust the stopper (56) so that the shortest distance from the center of the center spindle to the lever (M2) becomes 26.5 – 27.0mm.

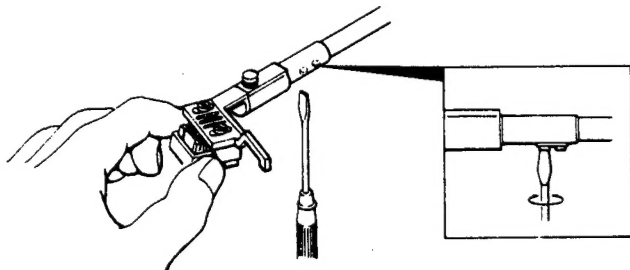


2. There is a shaft which is accessible with an ordinary screwdriver through the hole below the tonearm. (See illustration at right.) When the stylus has reached a point approximately 55mm from the turntable center, turn the shaft clockwise or counterclockwise and select a position where it actuates the auto-return.



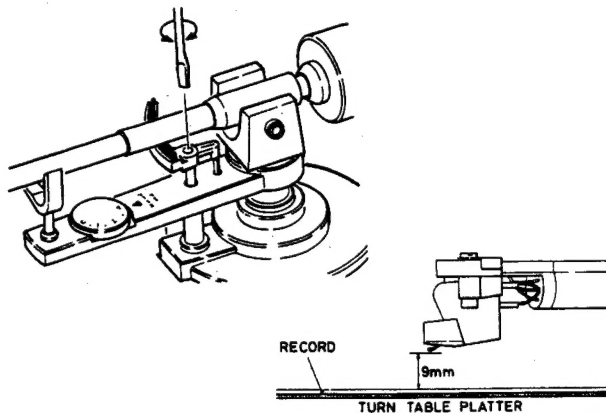
ADJUSTMENT OF HEADSHELL

The headshell attached to the tonearm should not be inclined either to the right or to the left. If necessary, loosen the two screws on the bottom of the tubular arm and adjust the headshell. Be sure that the stylus is normal to the record surface.



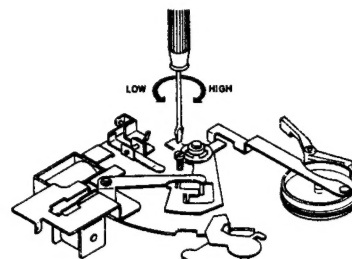
ADJUSTMENT OF TONEARM LIFTER

Depress the cueing button, and turn the screw (Y4) of the arm lifter (P) to adjust so that the distance between the stylus and the record surface becomes 9mm when the stylus of the arm moves up near the outer circumference of the record.



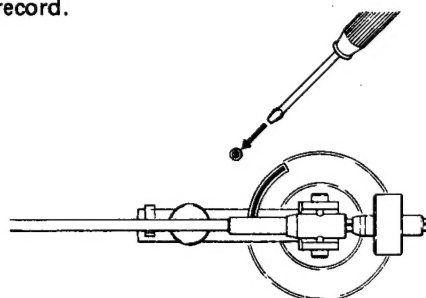
ADJUSTMENT OF LIFT-UP LEVER SPRING

Switch off power when the auto-return has worked and adjust spring tension to provide a clearance of 11mm between the stylus and the record. In this adjustment, the lift-up lever will go up if the screw (M6) is turned clockwise.



ADJUSTMENT OF STYLUS SET DOWN

Adjust the position the stylus comes down in an auto play. Adjust the lever (M43) shaft so that the needle comes down at the position of 147mm apart from the center of a 12" record.

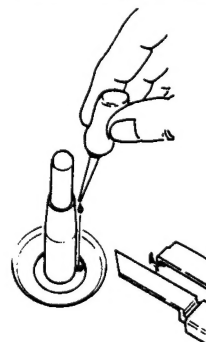


REPAIR

Dismount the turntable platter and supply two to three drops of oil into the D.D. motor through the hole in the motor housing.

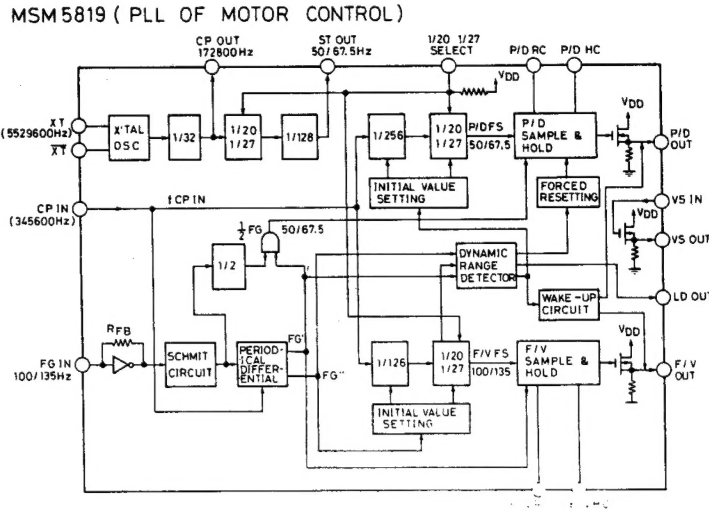
Be careful not to stain any exposed part with oil.

This caution is necessary to prevent operating trouble.



IC BLOCK DIAGRAM

MSM 5819



Description of Performance

1. Output signals F/V OUT, P/D OUT are set in the three states as shown below.

(1) Lock state

Both F/V OUT and P/D OUT provide normal performance, and the lock indicator (LD OUT) becomes "H" level (V_{DD}).

Lock range:

33-1/3 rpm $\pm 3.7\%$ of reference signal period T
45 rpm $\pm 5\%$ of reference signal period T

(NOTE)

$$\text{Reference signal period } T = \frac{1}{f_{CPIN} \times \frac{1}{128} \times \left(\frac{1}{20} \text{ or } \frac{1}{27} \right)}$$

(2) Underspeed

Both F/V OUT and P/D OUT become "H" level (V_{DD}), and the lock indicator (LD OUT) becomes "L" level (GND).

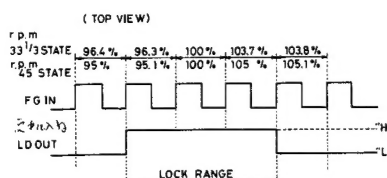
(3) Overspeed

Both F/V OUT and P/D OUT become "L" level (GND), and the lock indicator (LD OUT) becomes "L" level (GND).

The relation between LD OUT and lock range is as shown below.

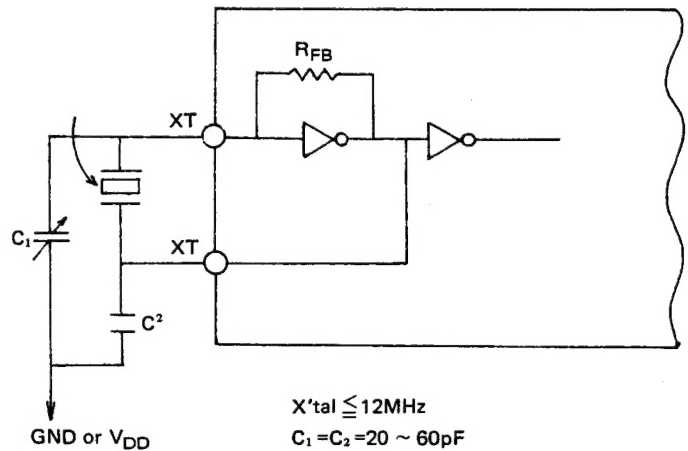
(NOTE)

LD becomes "H" level when FG signal period is within 95.1 to 105% of the reference signal period T in the case of 45 rpm or within 96.3 to 103.7% in the case of 33-1/3 rpm, and becomes "L" level in other regions.



2. Crystal oscillation

Crystal and trimmer capacitor for fine adjustment are combined to terminals XT, $\bar{X}\bar{T}$ as shown below.



3. CP OUT, CP IN terminals

CP OUT is an output terminal of reference signal (crystal oscillation frequency) divided down by 1/32, and CP IN is a reference signal input terminal. Usually, CP OUT and CP IN are connected with each other.

4. FG IN terminal

This is an input terminal of detection signal (comparison signal), and is operated by capacitor coupling (about 1 μF).

5. 1/20, 1/27 selection terminal (pull-up resistance built in)

This is a speed selection terminal for reference signal, and can be used to change the rotating speed of the motor. (Refer to Function Table.)

6. ST OUT terminal

This is a reference output terminal for strobe of 1/16 duty, and is suited to one-line application.

7. VS IN, VS OUT terminals

These are reference voltage setting terminals, and are source follower outputs. According to the voltage at VS IN terminal, a voltage within 0 to $V_{DD}-V_{IN}$ may be obtained at VS OUT terminal. ($V_{IN} \approx 2V$)

8. F/V RC terminal

This is an R_1, C_1 connection terminal for generation of sawtooth wave in order to obtain F/V output voltage, and can be used within the range of $C_1 \leq 1\mu F$, $R_1 \geq 10k\Omega$. (Refer to an example of applied circuit.)

In designing, the values of C_1, R_1 are selected on the basis of FG signal period T_{33} at the time of 33-1/3 rpm so that the following relation may be established.

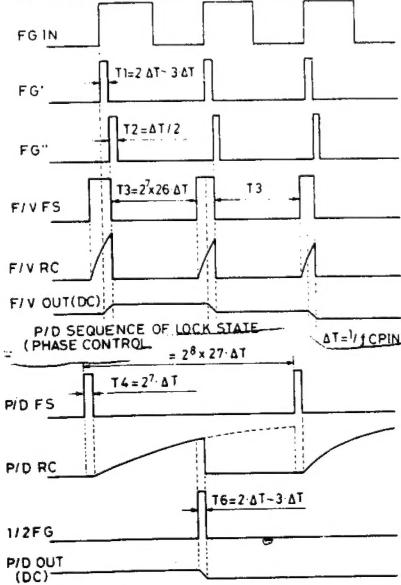
$$T_1 = C_1 \times R_1 \quad (\text{where, } T_1 = \frac{1}{20} \times T_{33})$$

9. F/V HC terminal

This is a holding capacitor connection terminal in order to obtain F/V output voltage, intended to select values so as to satisfy the conditions: $HC \approx 1/10C_1$, $HC \geq 1000pF$. (Refer to an example of applied circuit.)

MSM5819 (PLL OF MOTOR CONTROL)

F/V SEQUENCE OF LOCK STATE (Speed Control)



10. P/D RC terminal

This is an R_2, C_2 connection terminal for generation of sawtooth wave in order to obtain P/D output voltage, and can be used within the range of $C_2 \leq 1\mu F$, $R_2 \geq 10k\Omega$. (Refer to an example of applied circuit.)

In designing, the values of C_2, R_2 are selected on the basis of FG signal period T_{33} at the time of 33-1/3 rpm so that the following relation may be established.

$$T_2 = C_2 \times R_2 \quad (\text{where, } T_2 = \frac{1}{0.7} \times T_{33})$$

11. P/D HC terminal

This is a holding capacitor connection terminal in order to obtain P/D output voltage, intended to select values so as to satisfy the conditions: $HC \approx 1/10C_2$, $HC \geq 1000pF$.

12. F/V OUT, P/D OUT terminals

These are source follower buffer output terminals of F/V HC and P/P HC terminals, and are capable of obtaining outputs shifted in level by about +2V with respect to each HC level of F/V and P/D. The source follower resistance is TYP 40 kΩ.

13. LD OUT

This is a lock detection terminal, becoming "H" level (V_{DD}) when the motor speed is around the normal value (within the lock range), and turning to "L" level (GND) if the motor speed is too high or too low (out of the lock range).

FUNCTION TABLE

1/20, 1/27 SELECT TARMINAL	DIVIDING VALUE	r p m (REVOLUTIONS PER MINUTE)
L	1/27	33 1/3
H	1/20	45

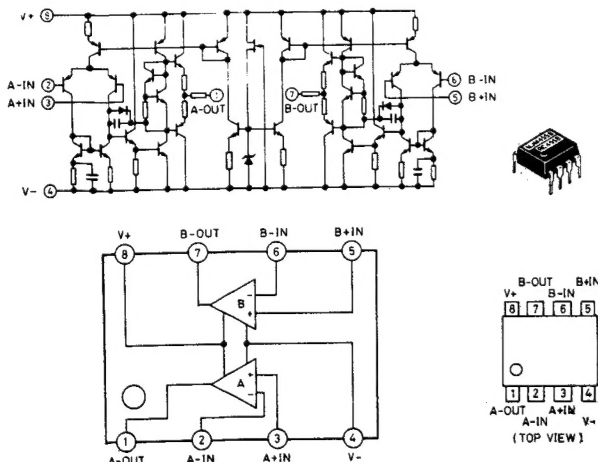
L = GND H = OPEN or V_{DD}

CPIN	1	18	V_{DD}
VS OUT	2	17	XT
VSIN	3	16	$\bar{X}T$
FGIN	4	15	CP OUT
F/V RC	5	14	ST OUT
F/V HC	6	13	1/20, 1/27 SELECT
F/V OUT	7	12	P/D RC
LD OUT	8	11	P/D HC
GND	9	10	P/D OUT



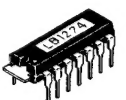
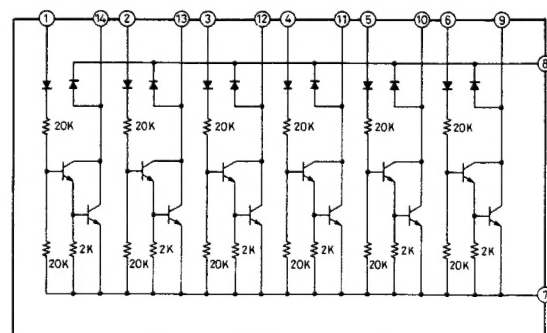
MJM 4558

NJM4558 RC4558
(DUAL HIGH-PERFORMANCE OPERATIONAL AMPLIFIERS)



LB 1274

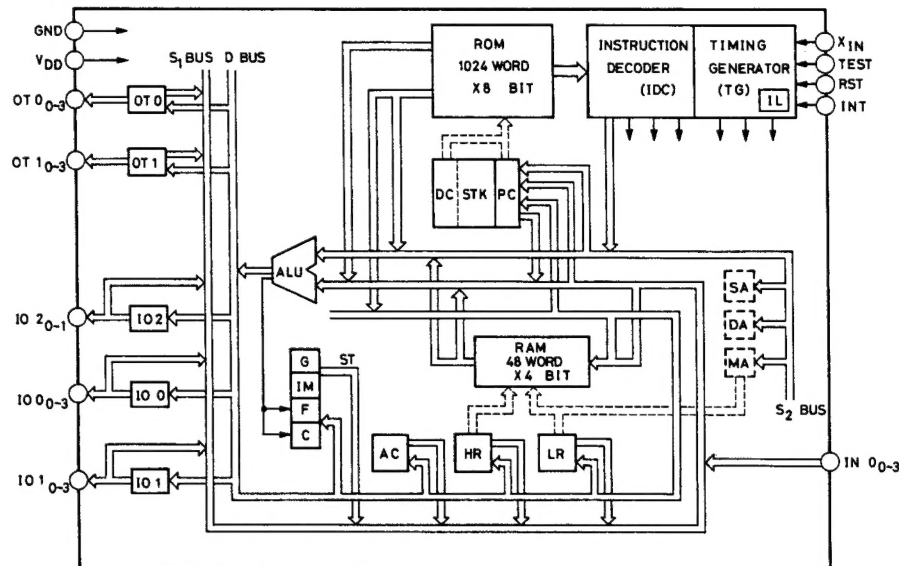
LB1274 (DARLINGTON TRANSISTOR ARRAY)



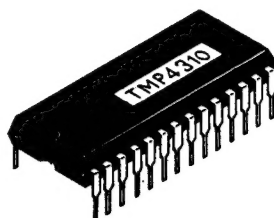
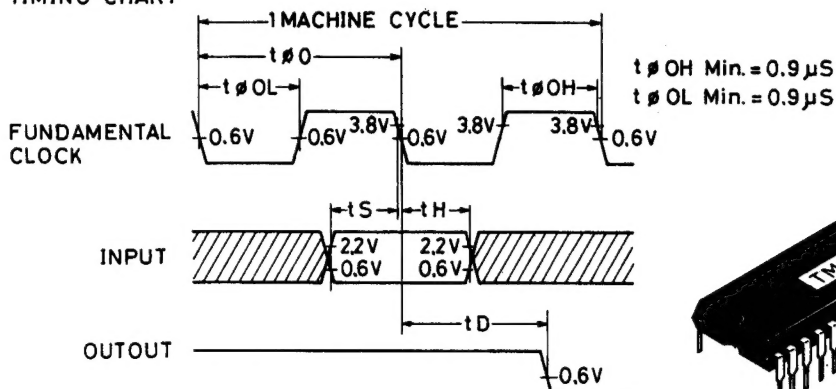
IC BLOCK DIAGRAM TMP4310

TMP4310 (1-CHIP MICRO-COMPUTER <4bit >)
BLOCK DIAGRAM

1/2



TIMING CHART



PIN CONNECTION

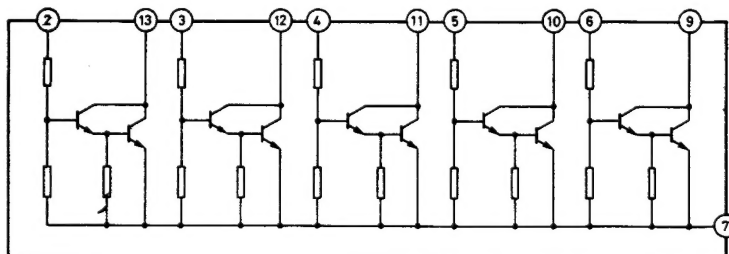
IN 0 ₀	1	28	VDD
IN 0 ₁	2	27	X1N
IN 0 ₂	3	26	TEST
IN 0 ₃	4	25	IO 1 ₀
OT 0 ₀	5	24	IO 1 ₁
OT 0 ₁	6	23	IO 1 ₂
OT 0 ₂	7	22	IO 1 ₃
OT 0 ₃	8	21	IO 0 ₀
IO 2 ₀	9	20	IO 0 ₁
IO 2 ₁	10	19	IO 0 ₂
OT 1 ₀	11	18	IO 0 ₃
OT 1 ₁	12	17	INT
OT 1 ₂	13	16	RST
GND	14	15	OT 1 ₃

(TOP VIEW)

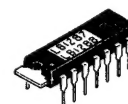
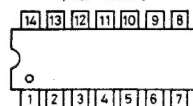
PIN NAME / FUNCTION

NAME	I/O	FUNCTION
IN 0 ₀ ~ IN 0 ₃	INPUT	INPUT PORT IN 0
OT 0 ₀ ~ OT 0 ₃	OUTPUT	OUTPUT PORT OT 0
OT 1 ₀ ~ OT 1 ₃	OUTPUT	OUTPUT PORT OT 1
IO 0 ₀ ~ IO 0 ₃	I/O	I/O PORT IO 0
IO 1 ₀ ~ IO 1 ₃	I/O	I/O PORT IO 1
IO 2 ₀ ~ IO 2 ₃	I/O	I/O PORT IO 2
RST	INPUT	INITIALIZE SIGNAL INPUT
INT	INPUT	INTERRUPT SIGNAL INPUT
X1N	INPUT	FUNDAMENTAL CLOCK TERMINAL
TEST	INPUT	LSI TEST INPUT
VDD		5V (POWER SOURCE)
GND		0V (POWER SOURCE)

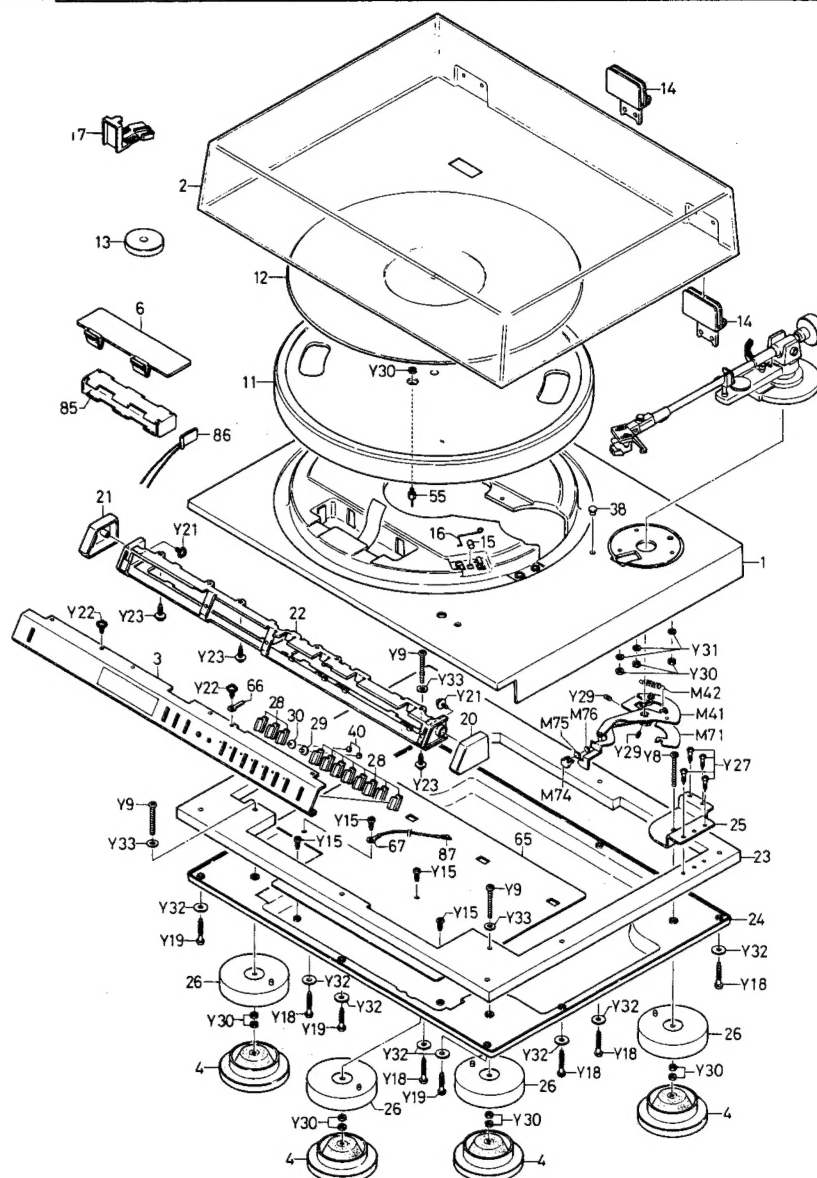
LB1287



(TOP VIEW)



EXPLODED VIEW (CABINET)



Key No.	GENERAL	EUROPE	AUSTRALIA	CANADA	Description	Q'ty
	141-6-133T-14201	141-6-133T-14202	141-6-133T-14203	141-6-133T-14204	Individual Carton	1
	141-6-410T-46401 4-236T-11201	141-6-410T-46402	141-6-410T-46403	141-6-410T-46404	Instruction Manual Plug Ass'y	1 1
1	141-0-121T-16401	141-0-121T-16402	141-0-121T-16403	141-0-121T-16404	Deck Panel Ass'y	1
2	141-0-194T-01401	141-0-194T-01401	141-0-194T-01404	141-0-194T-01404	Dust Cover Ass'y	1
8	141-2-445T-16200	141-2-445T-16200	141-2-445T-23900	141-2-445T-16200	Rubber Cushion, AC Cord	1
23	141-2-126T-33100	141-2-126T-33101	141-2-126T-33100	141-2-126T-33100	Back Lid	1
27	141-2-852T-60601	141-2-852T-59700	141-2-852T-60601	141-2-852T-60601	Spring Wire	1
69	141-2-472T-01201	141-2-472T-01200	141-2-464T-20671	141-2-472T-01201	Fixer	5
70	—	141-6-476T-14700	—	—	Indication Label, Fuse	1
71	—	141-2-411T-12200	—	—	Plate Nut	1
72	—	141-2-327T-22300	—	—	Insulator	1
73	—	141-2-322T-64500	—	—	Shield Plate	1
74	—	141-2-250T-02500	—	—	Sheet	1
81	4-300T-20100	4-300T-19900	4-300T-25700	4-300T-22300	Power Trans (TP1)	1
82	4-300T-20200	4-300T-20000	4-300T-25800	4-300T-22400	Power Trans (TP2)	1
83	4-243R-00194	4-243T-77172 4-243T-82672	4-243T-84200	4-243T-81271	Power Cord	1
88	4-238T-01371	4-238T-12873	4-238T-01373	4-238T-01371	Power Switch (S811)	1
89	—	141-2-383T-03900	141-2-383T-03900	—	Fuse Holder	1
90	—	4-234T-01971	4-234T-01971	—	Fuse 800mA	1
91	4-231T-37603	4-231T-53677	—	—	Switch (S812)	1
103	141-4-233T-40702	141-4-233T-40701	141-4-233T-40701	141-4-233T-40703	P.C. Board Ass'y, Power Supply	1
C934	4-223T-05400	4-223T-11700 (0.01μF)	4-223T-11700 (0.01μF)	4-223T-10700 (0.047μF)	Capacitor	1
R910 911	—	100 ohm 1/2W	100 ohm 1/2W	—	Resistor	2
A6	141-2-421T-30900	141-2-421T-30902	141-2-421T-30900	141-2-421T-30900	Special Screw	2
A10	4-157T-00801	4-157T-01201	4-157T-00801	—	Cartridge Ass'y	1

PARTS LIST

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
PACKING				CABINET & CHASSIS			
	See Page 8	Individual Carton	1	60	141-2-310T-37100	Bracket	1
	141-6-144T-62900	Foam Plastic Case	2	61	141-2-377T-26400	Bracket, P.C. Board	1
	141-6-317T-18500	Pad, Top	1	62	141-0-210T-21500	Bracket Ass'y	1
	141-6-317T-19600	Pad, Paper 645 x 560	1	63	141-2-457T-23000	Special Washer	1
	141-6-317T-23100	Pad, Side	2	64	141-2-490T-02700	Tube	7
	141-6-317T-06700	Pad, Turntable Sheet	1	65	141-2-322T-60800	Shield Plate	1
	141-6-231T-50705	Inner Poly. Cover, Set	1	66	123-2-472R-00600	Lug	2
	141-6-231T-50600	Inner Poly. Cover, Dust Cover	1	67	123-2-472R-00401	Lug	3
	141-6-231T-35400	Inner Poly. Cover, Turntable	1	68	141-2-327T-22000	Insulator	1
	141-6-231T-15250	Inner Poly. Cover, Cord	1	69	See Page 8	Fixer	5
	141-6-231T-10100	Inner Poly. Cover, Accessory	8	70	See Page 8	Indication Label, Fuse	1
	141-2-246T-46500	Sheet	1	71	See Page 8	Plate Nut	1
	141-6-479T-42300	Caution Label	1	72	See Page 8	Insulator	1
	141-6-472T-17000	Caution Label, Turntable	1	73	See Page 8	Shield Plate	1
				74	See Page 8	Sheet	1
ACCESSORY				SCREW MOUNTING			
	See Page 8	Instruction book	1	Y1		Pan Head Screw 2 x 3mm	
		Battery, UM-3	4	Y2		Pan Head Screw 2 x 4mm	
CABINET & CHASSIS				Y3		Pan Head Screw 2 x 6mm	
1	See page 8	Deck Panel Ass'y	1	Y4		Pan Head Screw 2 x 14mm	
2	See page 8	Dust Cover Ass'y	1	Y5		Pan Head Screw 2.6 x 6mm	
3	141-0-122T-33600	Front Panel Ass'y	1	Y6		Pan Head Screw 3 x 4mm	
4	141-0-174T-09002	Stand Ass'y	4	Y7		Pan Head Screw 3 x 6mm	
5	141-0-161T-72200	Push Button Ass'y, Power Switch	1	Y8		Pan Head Screw 3 x 25mm	
6	141-2-128T-13600	Battery Lid	1	Y9		Pan Head Screw 3 x 35mm	
7	123-2-453R-10500	Plastic Washer, AC Cord	1	Y10		Pan Head Screw with Washer 3 x 6mm	
8	See Page 8	Rubber Cushion, AC Cord	1	Y11		Pan Head Tapping Screw 2.6 x 6mm	
9	141-2-464T-30000	Fixer	1	Y12		Pan Head Tapping Screw 2.6 x 8mm	
10	141-2-445T-16000	Rubber Cushion, Output Cord	1	Y13		Pan Head Tapping Screw 2.6 x 10mm	
11	141-2-118T-01200	Turntable	1	Y14		Pan Head Tapping Screw 3 x 6mm	
12	141-2-246T-41801	Sheet	1	Y15		Pan Head Tapping Screw 3 x 8mm	
13	141-2-352T-19900	45 RPM Adaptor	1	Y16		Pan Head Tapping Screw 3 x 10mm	
14	141-2-251T-07000	Hinge	2	Y17		Pan Head Tapping Screw 3 x 16mm	
15	141-2-687T-02300	Weight	1	Y18		Pan Head Tapping Screw 3 x 25mm	
16	141-2-852T-62600	Spring Wire	1	Y19		Pan Head Tapping Screw 3 x 30mm	
17	141-2-875T-00100	Galige	1	Y20		Pan Head Tapping Screw 4 x 12mm	
18	141-2-472T-01201	Lug	5	Y21		Pan Head Tapping Screw with Washer 3 x 6mm	
19	141-2-340T-00200	Rope	1	Y22		Pan Head Tapping Screw with Washer 3 x 8mm	
20	141-2-153T-57900	Escutcheon, Right	1	Y23		Pan Head Tapping Screw with Washer 3 x 10mm	
21	141-2-153T-58000	Escutcheon, Left	1	Y24		Flat Head Screw 2 x 6mm	
22	141-2-210T-21600	Bracket	1	Y25		Flat Head Screw 3 x 5mm	
23	See page 8	Back Lid	1	Y26		Flat Head Tapping Screw 2.6 x 12mm	
24	141-2-125T-20100	Bottom Lid	1	Y27		Round Head Wood Screw 3.1 x 13mm	
25	141-2-274T-01600	Bracket, Stand	1	Y28		Headless Screw with Hexagon Hole 2.6 x 8mm	
26	141-2-174T-08900	Stand	4	Y29		Headless Screw with Hexagon Hole 3 x 4mm	
27	See page 8	Spring Wire	1	Y30		Regular Hexagon Nut 3mm	
28	141-2-161T-69200	Push Button	11	Y31		Washer 3 x 8 x 0.5mm	
29	141-2-161T-75200	Push Button, Stylus ON	1	Y32		Washer 3 x 8 x 1mm	
30	141-2-161T-75300	Push Button, Stylus reset	1	Y33		Washer 3 x 10 x 1mm	
31	141-2-411T-12100	Plate Nut, PT	4	Y34		Washer 3 x 13 x 1mm	
32	141-2-445T-11801	Rubber Cushion, PT	4	Y35		Spring Washer 2.6 x 5.3 x 0.5mm	
33	141-2-365T-50900	Bracket, Power Switch	1	Y36		Internal Tooth Lock Washer 2 x 4.8 x 0.32mm	
34	141-2-377T-26100	Bracket, P.C. Board	4	Y37		Pan Head Screw 3 x 10mm	
35	141-2-135T-66700	Cover, LED	1				
36	4-527T-11771	Motor with P.C. Board	1				
37	141-2-447T-62600	Cushion, Motor	2				
38	141-2-135T-65600	Cover	1				
39	141-2-246T-60400	Sheet, PT	2				
40	141-2-447T-00200	Cushion, Push Button	2				
41	141-2-310T-37000	Bracket	1				
42	141-2-742T-50000	Lever	1				
43	141-2-352T-46000	Spacer	1				
44	141-2-161T-75100	Push Button, Unit up	1				
45	141-2-735T-11400	Rod	1				
46	141-2-421T-27300	Special Screw	2				
47	141-2-421T-20900	Special Screw	2				
48	141-2-447T-61600	Cushion 1 x 15 x 12	1				
49	141-2-855T-57300	Spring Coil	2				
50	141-2-855T-57200	Spring Coil	1				
51	141-2-855T-66500	Spring Coil	1				
52	141-0-581T-07100	Gear Ass'y	1				
53	141-2-447T-46800	Cushion 10 x 20 x 3t	1				
54	141-2-453T-61300	Washer	1				
55	141-0-462T-59300	Boss Ass'y	1				
56	141-0-465T-17100	Stopper Ass'y	1				
57	141-0-351T-52100	Bracket Mtg. Ass'y	1				
58	141-2-852T-62500	Spring Wire	1				
59	141-2-464T-35500	Fixer	1				

PARTS LIST

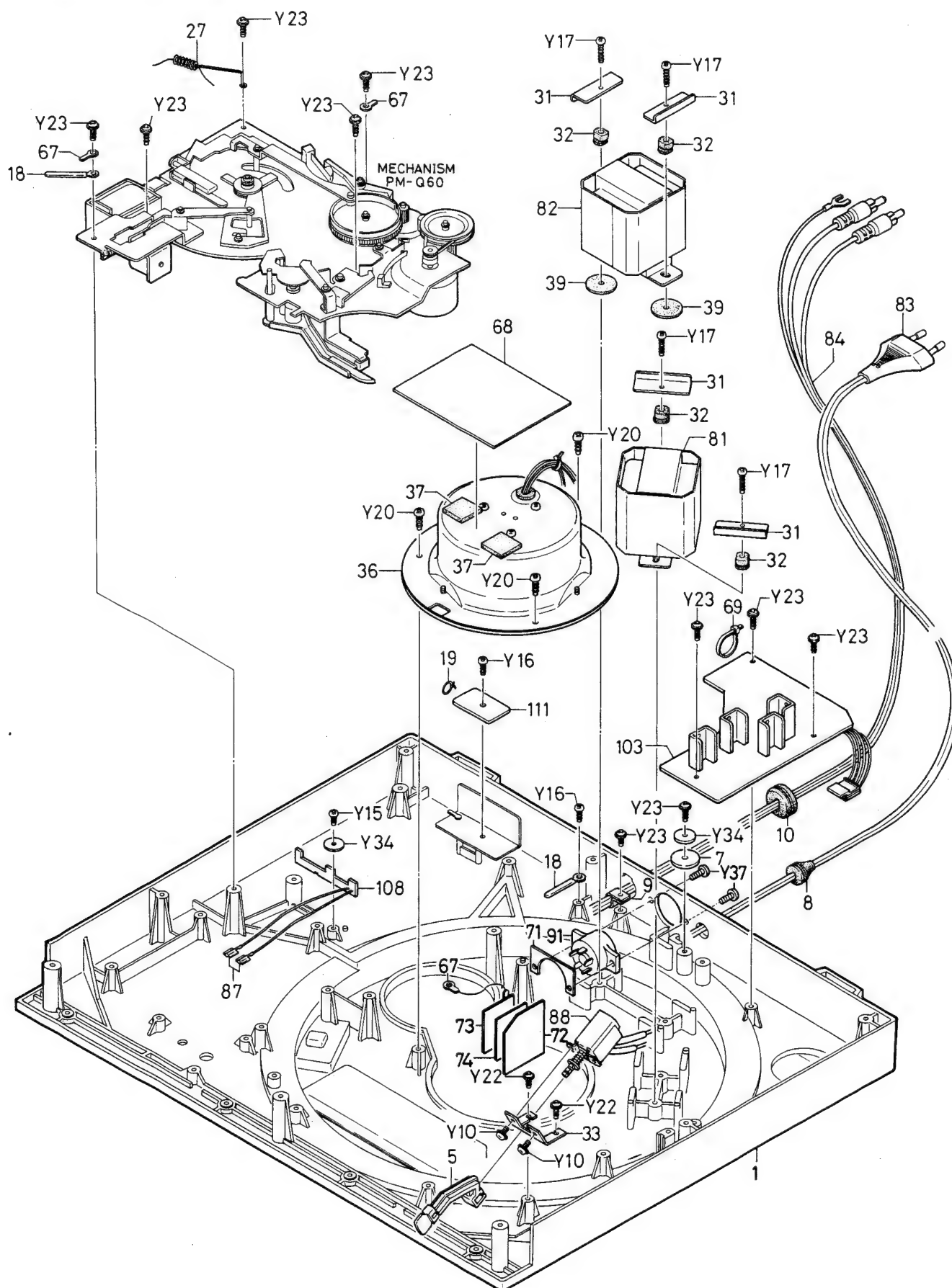
Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
ELECTRICAL PARTS				PITCH CONTROL PCB ASS'Y			
81	See Page 8	Power Trans. (PT1)	1	R220		Carbon 1M ohm ±5% 1/4W	1
82	See Page 8	Power Trans. (PT2)	1	R221		Carbon 1M ohm ±5% 1/4W	1
83	See Page 8	Power Cord	1	R222		Carbon 1M ohm ±5% 1/4W	1
84	4-243T-15171	Cord	1	R223		Carbon 1M ohm ±5% 1/4W	1
85	141-2-331T-04300	Holder, Battery	1	R224		Carbon 1M ohm ±5% 1/4W	1
86	4-243T-18800	Cord, Battery	1	R225		Carbon 1M ohm ±5% 1/4W	1
87	4-235T-34600	Socket	6	R207		Metal 910K ohm ±1% 1/4W	1
88	See Page 8	Power Switch (S811)	1	R301		Carbon 180K ohm ±5% 1/4W	1
89	See Page 8	Fuse Holder	1	R302		Carbon 100K ohm ±5% 1/4W	1
90	See Page 8	Fuse 800mA	1	R303		Carbon 100K ohm ±5% 1/4W	1
91	See Page 8	Switch S812	1	R304		Carbon 100K ohm ±5% 1/4W	1
111	4-230T-82100	P.C. Board, Output cord	1	R305		Carbon 180K ohm ±5% 1/4W	1
PITCH CONTROL PCB ASS'Y				R306		Carbon 100K ohm ±5% 1/4W	1
101	141-4-233T-40600	P.C. Board Ass'y, Pitch Control	1	R307		Carbon 1M ohm ±5% 1/4W	1
IC303,304		IC TC4001BP	5	R308		Carbon 1M ohm ±5% 1/4W	1
403,704				R309		Carbon 15K ohm ±5% 1/4W	1
707				R310		Carbon 15K ohm ±5% 1/4W	1
IC307		IC TC4013BP	1	R311		Carbon 10K ohm ±5% 1/4W	1
IC501,502		IC TC4019BP DIP16	2	R312		Carbon 10K ohm ±5% 1/4W	1
IC203		IC TC4020BP DIP16	1	R313		Carbon 1M ohm ±5% 1/4W	1
IC205		IC TC4024BP DIP14	1	R314		Carbon 180K ohm ±5% 1/4W	1
IC302		IC TC4030BP DIP14	1	R315		Carbon 2.7M ohm ±5% 1/4W	1
IC202,402		IC TC4069UBP	2	R316		Carbon 56K ohm ±5% 1/4W	1
IC301,503,		IC TC4071BP	3	R317		Carbon 10K ohm ±5% 1/4W	1
504				R318		Carbon 100K ohm ±5% 1/4W	1
IC201		IC TC4081BP	1	R319		Carbon 10K ohm ±5% 1/4W	1
IC305,306		IC TC4510BP DIP16	2	R401		Carbon 100K ohm ±5% 1/4W	1
IC204,401		IC TC4518BP DIP16	2	R402		Carbon 10K ohm ±5% 1/4W	1
IC706		IC TC5081P SIP09	1	R403		Carbon 100K ohm ±5% 1/4W	1
IC702,703		IC TC9122P S DIP18	2	R404		Carbon 100K ohm ±5% 1/4W	1
IC705		IC SN74LS124N DIP16	1	R405		Carbon 56K ohm ±5% 1/4W	1
IC701		IC TMP4310P DIP28	1	R406		Carbon 10K ohm ±5% 1/4W	1
D201~206		Diode 1S2473	6	R407		Carbon 2.7M ohm ±5% 1/4W	1
D301~304		Diode 1S2473	4	R408		Carbon 15K ohm ±5% 1/4W	1
D401~404		Diode 1S2473	4	R409		Carbon 150 ohm ±5% 1/4W	1
D501,502		Diode 1S2473	2	R410		Carbon 39K ohm ±5% 1/4W	1
D701		Diode 1S2473	1	R411,412,		Carbon 22K ohm ±5% 1/4W	1
D702		Zener Diode WZ050	1	414,416,		Metal 30K ohm ±5% 1/4W	6
Q401,501		Transistor 2S536	21	418,421			
502				R422,424,			
701~				426,428		Metal 30K ohm ±1% 1/4W	4
717,721				R413,415,		Metal 15K ohm ±1% 1/4W	6
Q718~720				410,423,			
VR201				425,427			
L401				R419		Metal 91K ohm ±1% 1/4W	1
	4-222T-82982	Transistor 2SC929	3	R420		Metal 560K ohm ±1% 1/4W	1
	4-253T-01020	Semifixed Variable Resistor	1	R429		Metal 910K ohm ±1% 1/4W	1
	4-236T-10573	Hi-frequency Choke Coil	1	R501		Carbon 1M ohm ±5% 1/4W	1
	4-236T-10500	Plug 6P	1	R502		Carbon 220K ohm ±5% 1/4W	1
	4-236T-12471	Plug	1	R503		Carbon 680K ohm ±5% 1/4W	1
	4-236T-12471	Plug	2	R504		Carbon 330K ohm ±5% 1/4W	1
	4-236T-10575	Plug, 8P	1	R701,703,		Carbon 4.7K ohm ±5% 1/4W	6
	4-236T-10572	Plug	1	705,706,			
	4-236T-12400	Plug, 1P	3	707,708			
	4-235T-65372	Socket, 4P	3	R702,704		Carbon 4.7K ohm ±5% 1/4W	2
	4-235T-69400	Socket, 5P	2	R710		Carbon 120K ohm ±5% 1/4W	1
	141-2-322T-35600	Shield Plate	1	R711		Carbon 6.8K ohm ±5% 1/4W	1
	141-2-464T-20671	Fixer	1	R712		Carbon 12K ohm ±5% 1/4W	1
RESISTORS				R713,715		Carbon 120K ohm ±5% 1/4W	2
R201		Carbon 100K ohm ±5% 1/4W	1	R714,716		Carbon 120K ohm ±5% 1/4W	2
R202		Carbon 100K ohm ±5% 1/4W	1	R717,718,		Carbon 12K ohm ±5% 1/4W	4
R203		Carbon 47K ohm ±5% 1/4W	1	719,720			
R204		Carbon 68K ohm ±5% 1/4W	1	R721,758		Carbon 120K ohm ±5% 1/4W	2
R205		Carbon 100K ohm ±5% 1/4W	1	R722		Carbon 4.7K ohm ±5% 1/4W	1
R206		Carbon 2.7M ohm ±5% 1/4W	1	R723		Carbon 27K ohm ±5% 1/4W	1
R208		Carbon 10K ohm ±5% 1/4W	1	R724		Carbon 4.7K ohm ±5% 1/4W	1
R209		Carbon 100K ohm ±5% 1/4W	1	R725,726		Carbon 120K ohm ±5% 1/4W	2
R210		Carbon 100K ohm ±5% 1/4W	1	R727		Carbon 12K ohm ±5% 1/4W	1
R211		Carbon 2.7M ohm ±5% 1/4W	1	R728		Carbon 4.7K ohm ±5% 1/4W	1
R212		Carbon 180K ohm ±5% 1/4W	1	R729		Carbon 1.5K ohm ±5% 1/4W	1
R213		Carbon 1M ohm ±5% 1/4W	1	R730,732,		Carbon 4.7K ohm ±5% 1/4W	4
R214		Carbon 1M ohm ±5% 1/4W	1	734,736			
R215		Carbon 1M ohm ±5% 1/4W	1	R731,733,		Carbon 4.7K ohm ±5% 1/4W	3
R216		Carbon 1M ohm ±5% 1/4W	1	735			
R217		Carbon 1M ohm ±5% 1/4W	1	R737,738		Carbon 4.7K ohm ±5% 1/4W	4
R218		Carbon 1M ohm ±5% 1/4W	1	742,751			
R219		Carbon 1M ohm ±5% 1/4W	1	R756		Carbon 56K ohm ±5% 1/4W	1
				R757		Carbon 5.6K ohm ±5% 1/4W	1
				R759		Carbon 8.2K ohm ±5% 1/4W	1
				R739		Carbon 27K ohm ±5% 1/4W	1

PARTS LIST

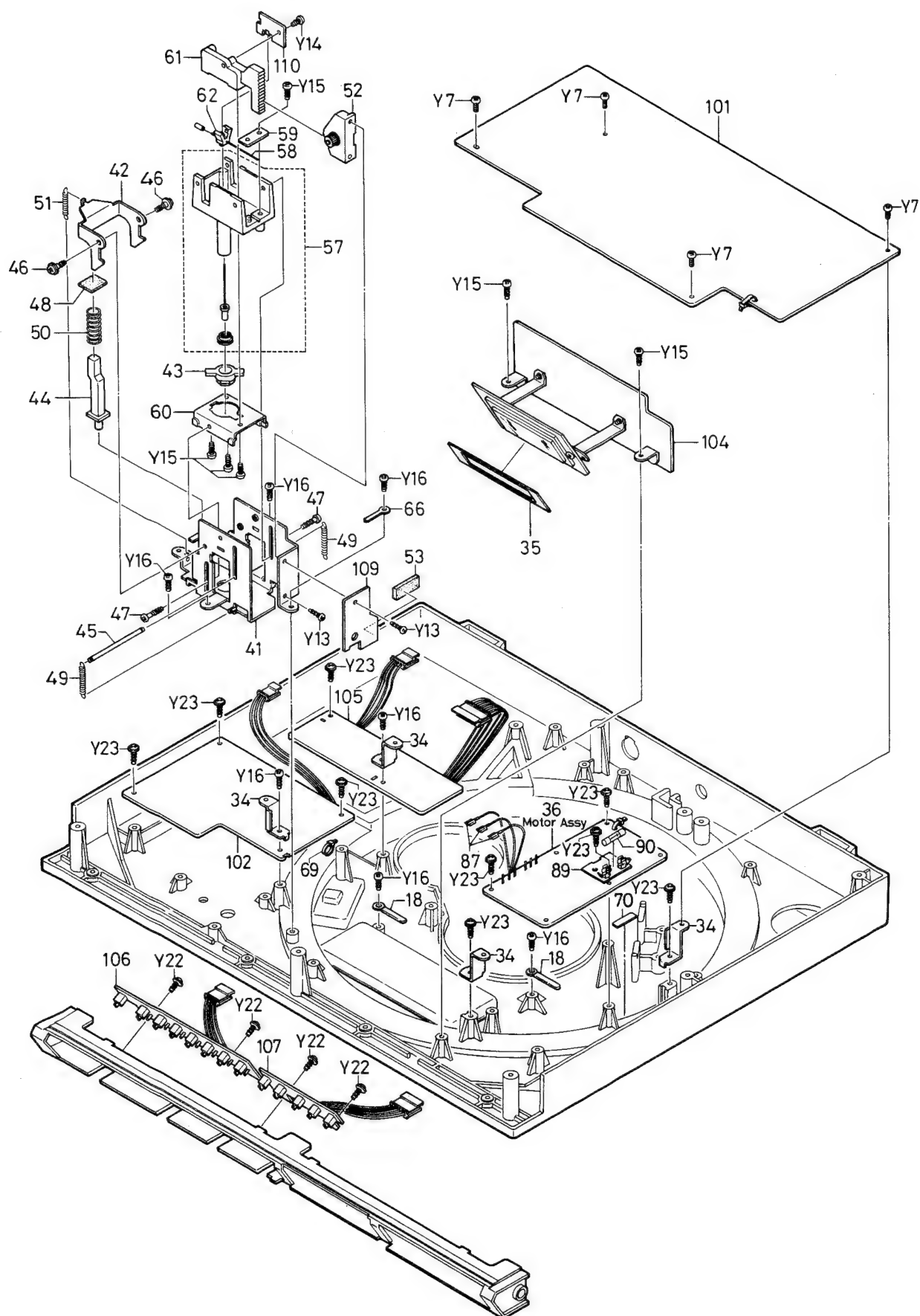
Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
PITCH CONTROL PCB ASS'Y				CONTROL PCB ASS'Y			
R740		Carbon 56K ohm ±5% 1/4W	1	810,811			
R741		Carbon 22K ohm ±5% 1/4W	1	815,816			
R743		Carbon 2.7K ohm ±5% 1/4W	1	D805,812		Diode 1N4003	3
R744		Carbon 3.3K ohm ±5% 1/4W	1	813			
R745		Carbon 4.7K ohm ±5% 1/4W	1	D814		Diode 1N60 FM	1
R747		Carbon 27K ohm ±5% 1/4W	1	Q801,803		Transistor 2SC536 AUD.	2
R748		Carbon 39K ohm ±5% 1/4W	1	Q804		Transistor 2SD545	1
R749		Carbon 10K ohm ±5% 1/4W	1	Q802		Transistor 2SB598	1
R750		Carbon 15K ohm ±5% 1/4W	1	Q805,806		Transistor 2SC536 AUD.	4
R752		Carbon 2.7K ohm ±5% 1/4W	1	807,808			
R755		Carbon 150 ohm ±5% 1/4W	1				
R746		Carbon 22K ohm ±5% 1/4W	1				
R754		Metal 68 ohm ±5% 1W	1				
		CAPACITORS				RESISTORS	
C201		P P Con 0.1μF 100V ±5%	1	R831,832		FP-Carbon 10 ohm ±5% 1/4W	2
C202		Mylar 0.0022μF 50V ±20%	1	R820		Metal 68 ohm ±5% 2W	1
C203		Al Electrolytic 2.2μF 50V +40 -20%	1	R819,826		Carbon 820 ohm ±10% 1/4W	5
				827,828			
C204,209		Electrolytic 220μF 10V	2	838			
C208		Electrolytic 10μF 10V	1	R815		Carbon 2.2K ohm ±10% 1/4W	1
C205,206		Ceramic 0.01μF 50V +80 -20%	4	R816,817		Carbon 3.3K ohm ±10% 1/4W	2
207,211				R809,810		Carbon 5.6K ohm ±10% 1/4W	2
C210		Ceramic 0.001μF 50V ±10%	1	R802,804		Carbon 10K ohm ±10% 1/4W	6
C301,302		Mylar 0.047μF 50V ±20%	2	805,807			
C303		Mylar 0.033μF 50V ±20%	1	808,812			
C304		Al Electrolytic 1μF 10V +40 -20%	1	R813,822		Carbon 10K ohm ±10% 1/4W	6
C305,306		Ceramic 47pF 50V ±20%	2	823,824			
C307,310		Ceramic 0.01μF 50V +80 -20%	5	825,834			
311,314,315				R835,818		Carbon 10K ohm ±10% 1/4W	2
C317		Ceramic 0.001μF 50V ±10%	1	R803		Carbon 22K ohm ±10% 1/4W	1
C312,313		Ceramic 470pF 50V ±10%	2	R829,830		Carbon 47K ohm ±10% 1/4W	2
C308,316		Ceramic 220pF 50V ±10%	2	R821,837		Carbon 100K ohm ±10% 1/4W	2
C309		Ceramic 0.0033μF 50V ±10%	1	R836		Carbon 1M ohm ±10% 1/4W	1
C402,407		Electrolytic 100μF 10V	2	R801,811		Carbon 1.5M ohm ±10% 1/4W	4
C403		Electrolytic 10μF 10V	1	814,833			
C405		Electrolytic 220μF 10V	1	R806		Carbon 2.2M ohm ±10% 1/4W	1
C408		Electrolytic 330μF 10V	1	R839,840		Carbon 100K ohm ±10% 1/4W	4
C404		Mylar 0.022μF 50V ±10%	1	841,842			
C406,409		Ceramic 0.01μF 50V +80 -20%	3			CAPACITORS	
410						Electrolytic 1μF 50V	2
C501 ~		Ceramic 0.01μF 50V +80 -20%	4	C803,825		Electrolytic 4.7μF 25V	1
504				C809		Electrolytic 10μF 16V	1
C701		Al Electrolytic 0.47μF 10V +40 -20%	1	C823		Electrolytic 100μF 10V	1
				C802,805		Mylar 0.01μF 50V ±20%	3
C702		Ceramic 100pF 50V ±10%	1	819			
C703,705,709		Mylar 0.001μF 10V ±20%	3	C807,810		Ceramic 0.001μF 50V ±10%	5
C708		Mylar 0.1μF 50V ±20%	1	811,832,833			
C707		Ceramic 470pF 50V ±10%	1	C801,804		Ceramic 0.01μF 50V +80 -20%	15
C711		Electrolytic 330μF 6.3V	1	806,813			
C712		Electrolytic 470μF 6.3V	1	814,815			
C713,714		Ceramic 0.01μF 50V +80 -20%	5	816,817			
715,716				818,821			
717				822,824			
C718,719		Ceramic 0.01μF 50V +80 -20%	2	831,820			
C704,720		Ceramic 0.022μF 50V +80 -20%	2	834			
C721		Electrolytic 10μF 10V	1	C812		Ceramic 0.047μF 50V +80 -20%	1
CONTROL PCB ASS'Y				POWER SUPPLY PCB ASSY			
102	141-4-233T-40900	P.C. Board Assy, Control	1	103	See Page 8	P.C. Board Assy, Power Supply	1
RAI	4-221T-02900	Resistor	1	Q901,902		Transistor 2SD330	4
	4-235T-90700	Socket	1	903,904			
	4-235T-69471	Socket	2	Q905		Transistor 2SD400	1
	4-236T-10271	Plug	1	Q906		Transistor 2SD545	1
IC801,802		IC TC4001BP	3	Q907		Transistor 2SB598	1
804				D908,909		Diode W02	5
IC807		IC TC4011BP	1	910,911			
IC806		IC TC4013BP	1	912			
IC805		IC TC4043BP	1	D905		Zener Diode WZ056	1
IC803		IC TC4071BP	1	D906,907		Zener Diode WZ096	2
IC808		IC LB1287 DIP14	1	D903		Zener Diode WZ100	1
D801,802		Diode DS442 X	12	D902		Zener Diode WZ192	1
803,804				D901		Zener Diode XZ215	1
806,807				D904		Diode 1S2473	1
808,809						Pan Head Tapping Screw, 3 x 8	4
					141-2-368T-18700	Heat Sink (Q901 ~ Q904)	4
					4-235T-90400	Socket	1

PARTS LIST

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'tv
POWER SUPPLY PCB ASS'Y				SENSOR AMP. PCB ASS'Y			
R910,911		RESISTORS		105	141-4-233T-40500	P.C. Board Ass'y, Sensor	1
R904		See Page 8		IC103		IC TL072CP DIP08 } or	1
R903		Solid 330 ohm $\pm 10\%$ 1/2W	1	TC101,102		IC TL082CP DIP08 }	2
R902		Solid 820 ohm $\pm 10\%$ 1/2W	1	Q101		IC RC4558P	1
R901		Solid 1.2K ohm $\pm 10\%$ 1/2W	1	D101		Transistor 2SA608	1
R905		Solid 1.5K ohm $\pm 10\%$ 1/2W	1	D102		Diode 1S1885	1
R906		Metal 68 ohms $\pm 5\%$ 2W	1	RL101	4-232T-05500	Diode 1S2473	1
R908,909		Carbon 680 ohm $\pm 10\%$ 1/4W	1		4-235T-90200	Relay	1
R907		Carbon 220 ohm $\pm 10\%$ 1/4W	2		4-235T-90500	Socket	1
		Carbon 470 ohm $\pm 10\%$ 1/4W	1	VR102	4-222T-82977	Socket	1
				VR101	4-222T-39576	Semifixed Variable Resistor	1
		CAPACITORS				RESISTORS	
C913		Electrolytic 2200 μ F 16V	1	R103		Carbon 220 ohm $\pm 5\%$ 1/4W	1
C905		Electrolytic 1000 μ F 35V	1	R102		Carbon 1K ohm $\pm 5\%$ 1/4W	1
C919,924		Electrolytic 470 μ F 16V	2	R121		Carbon 1.2K ohm $\pm 5\%$ 1/4W	1
C907		Electrolytic 330 μ F 25V	1	R720		Carbon 5.6K ohm $\pm 5\%$ 1/4W	1
C901		Electrolytic 220 μ F 35V	1	R101		Carbon 2.2K ohm $\pm 5\%$ 1/4W	1
C909		Electrolytic 220 μ F 25V	1	R107,108		Carbon 6.8K ohm $\pm 5\%$ 1/4W	2
C914,920		Electrolytic 220 μ F 16V	2	R119		Carbon 10K ohm $\pm 5\%$ 1/4W	1
C903		Electrolytic 100 μ F 25V	1	R109		Carbon 5.6K ohm $\pm 5\%$ 1/4W	1
C911		Electrolytic 100 μ F 16V	1	R113,116		Carbon 56K ohm $\pm 5\%$ 1/4W	4
C917		Electrolytic 470 μ F 6.3V	1				
C926		Electrolytic 33 μ F 16V	1	R104,105		Carbon 100K ohm $\pm 5\%$ 1/4W	2
C902,906		Electrolytic 10 μ F 25V	2	R118		Carbon 180K ohm $\pm 5\%$ 1/4W	1
C910,916		Electrolytic 10 μ F 16V	4	R106,112		Carbon 560K ohm $\pm 5\%$ 1/4W	2
921,925				R123		Carbon 1M ohm $\pm 5\%$ 1/4W	1
C908,912		Ceramic 0.01 μ F 50V +80 -20%	12	R111		Carbon 1.5M ohm $\pm 5\%$ 1/4W	1
915,918				R115		Carbon 2.2M ohm $\pm 5\%$ 1/4W	1
923,927				R110		Carbon 12K ohm $\pm 5\%$ 1/4W	1
929,930				R124		Carbon 27K ohm $\pm 5\%$ 1/4W	1
931,932				R126		Carbon 68K ohm $\pm 5\%$ 1/4W	1
933,904				R114		Metal 5.1K ohm $\pm 1\%$ 1/4W	1
C934		See Page 8				CAPACITORS	
DISPLAY PCB ASS'Y				C101		Mylar 0.022 μ F 25V $\pm 20\%$	1
104	141-4-233T-40800	P.C. Board Ass'y, Display	1	C102		Mylar 0.01 μ F 25V $\pm 20\%$	1
IC601,602		IC TC4511BP DIP16	3	C103,104		Tantal 47 μ F 6.3V $\pm 20\%$	2
603				C105,106		Ceramic 0.01 μ F 50V +80 -20%	4
IC604		IC LB1274	1	108,109			
Q601,602		LED SL271202 Green	1	C110		Electrolytic 1 μ F 50V	1
603		Transistor 2SC536 AUD.	3			SWITCH-1 PCB ASS'Y	
	141-2-377T-26300	Bracket P.C. Board	2	106	141-4-233T-41000	P.C. Board Ass'y, Switch-1	1
	141-2-377T-26200	Bracket P.C. Board	1	S851 ~	4-238T-08800	Switch	8
	141-2-377T-26201	Bracket P.C. Board	1	858			
		Pan Head Screw 3 x 6	6	D851 ~		LED SLP135B A or B Red	7
				857			
R601,602		RESISTORS			4-235T-90600	Socket	1
606,607		Carbon 470 ohm $\pm 10\%$ 1/4W	6	R851		Carbon Res. 820 ohm $\pm 10\%$ 1/2W	1
626,630						SWITCH-2 PCB ASS'Y	
R603,604		Carbon 470 ohm $\pm 10\%$ 1/4W	6	107	141-4-233T-41100	P.C. Board Ass'y, Switch-2	1
605,608				S821 ~	4-238T-08800	Switch	5
609,610				825			
R611,612		Carbon 470 ohm $\pm 10\%$ 1/4W	6		4-235T-90300	Socket	1
613,614						LEAD SWITCH PCB ASS'Y	
615,616				108	141-4-233T-41200	P.C. Board Ass'y, Lead Switch	1
R617,618		Carbon 470 ohm $\pm 10\%$ 1/4W	5	S401	4-231T-70300	Lead Switch	1
619,620					4-235T-34600	Socket	2
621						SENSOR RELAY PCB ASS'Y	
R622,623		Carbon 150 ohm $\pm 10\%$ 1/4W	3	109	141-4-233T-60900	P.C. Board Assy, Sensor Relay	1
624					4-236T-10571	Plug	1
R625		Carbon 220 ohm $\pm 10\%$ 1/4W	1			SENSOR PCB ASS'Y	
R627		Carbon 330 ohm $\pm 10\%$ 1/4W	1	110	141-4-233T-42100	P.C. Board Ass'y, Sensor	1
R628,629		Carbon 330 ohm $\pm 10\%$ 1/4W	2			Magnet Sensor F1410F	1
R631		Carbon 10K ohm $\pm 10\%$ 1/4W	1				
R632		Carbon 33K ohm $\pm 10\%$ 1/4W	1				
R633		Carbon 15K ohm $\pm 10\%$ 1/4W	1				
		CAPACITORS					
C601,602		Ceramic 0.01 μ F 50V +80 -20%	3				
603							
C604		Ceramic 470pF 50V $\pm 10\%$	1				



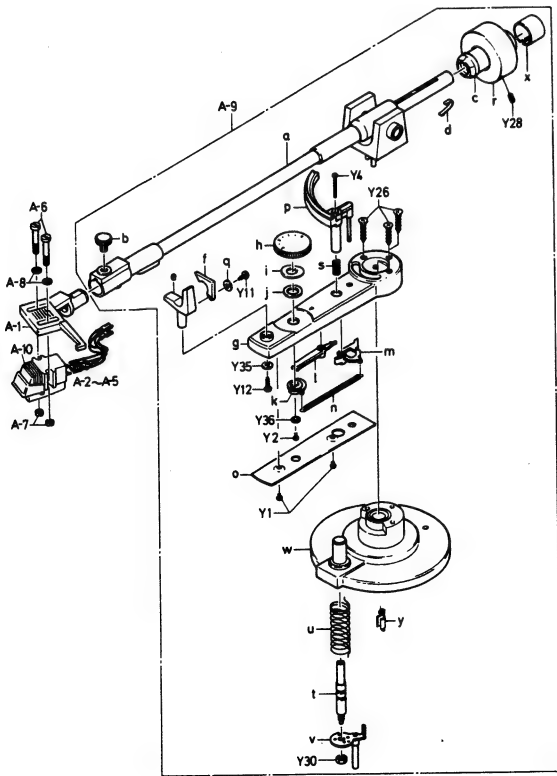
EXPLODED VIEW (CHASSIS)



PARTS LIST

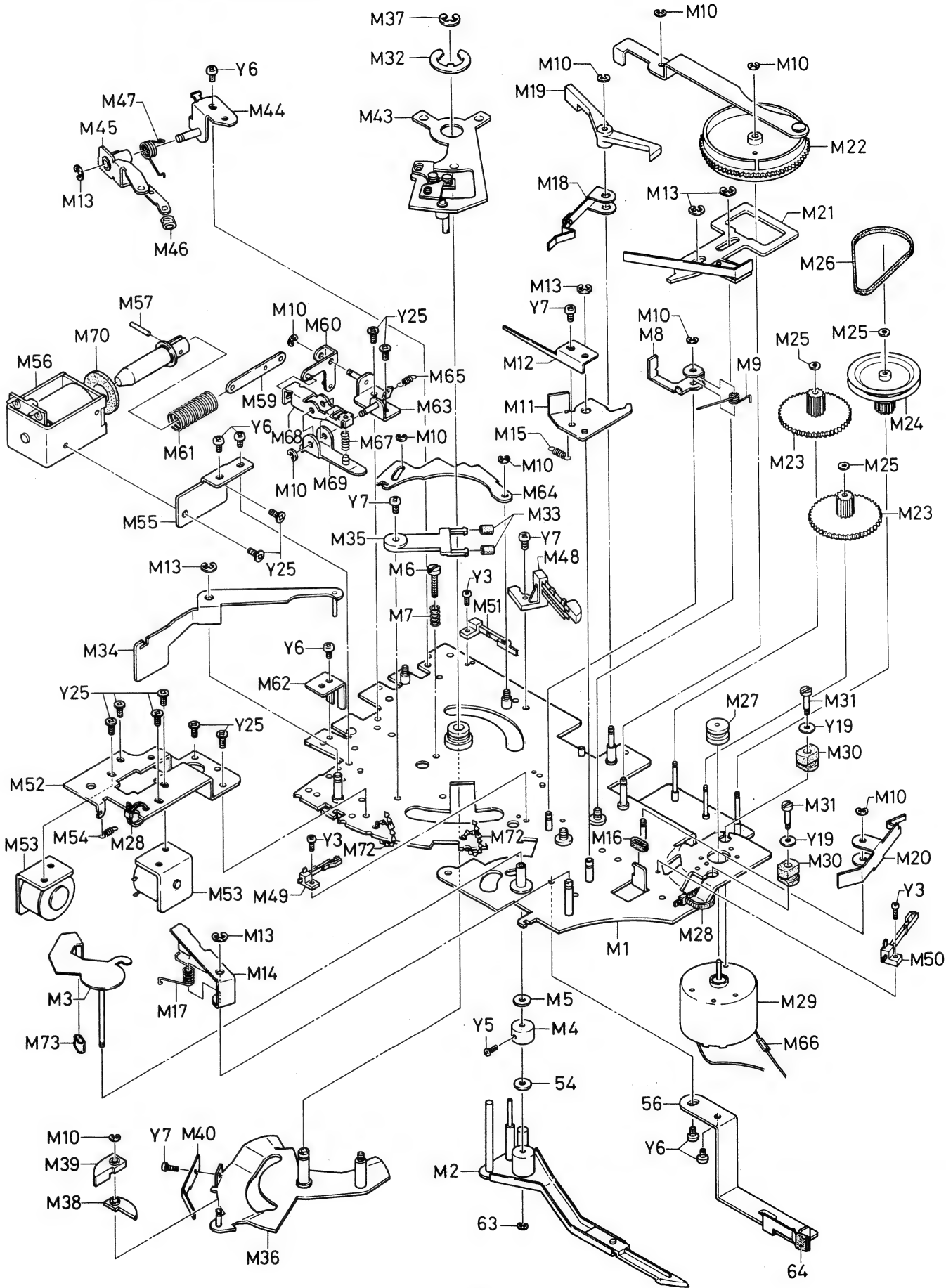
Key No.	Part No.	Description	Q'ty
ARM			
A1	141-0-286T-01100	Head Shell Ass'y	1
A2	4-243T-18100	Lead Cord (White)	1
A3	4-243T-18171	Lead Cord (Blue)	1
A4	4-243T-18172	Lead Cord (Red)	1
A5	4-243T-18173	Lead Cord (Green)	1
A6	See Page 8	Special Screw	2
A7	141-2-417T-19900	Stud Nut	2
A8	141-2-453T-32200	Washer	2
A9	141-0-743T-06922	Arm Complete	1
a	141-0-743T-06901	Arm Ass'y	1
b	141-2-155T-05700	Ring Knob	1
c	141-0-687T-02001	Weight Ass'y	1
d	141-0-853T-65700	Spring Plate Ass'y	1
e	141-2-873T-00600	Rest	1
f	141-2-873T-00700	Rest	1
g	141-2-243T-11000	Base	1
h	141-2-155T-05800	Ring Knob	1
i	141-2-457T-14600	Special Washer	1
j	141-2-453T-20800	Washer 6.2 x 10 x 0.5	1
k	141-2-661T-30400	Pulley	1
l	141-2-742T-45100	Lever	1
m	141-2-742T-45200	Lever	1
n	141-2-855T-48501	Spring Coil	1
o	141-2-135T-64000	Cover	1
p	141-0-872T-00520	Lifter Ass'y	1
q	141-2-453T-32300	Washer	1
r	141-2-687T-02100	Weight	1
s	141-2-855T-48600	Spring Coil	1
t	141-0-753T-92800	Shaft Ass'y	1
u	141-2-855T-48700	Spring Coil	1
v	141-0-742T-45300	Lever Ass'y	1
w	141-0-174T-09120	Stand Ass'y	1
x	141-2-352T-39600	Spacer	1
y	141-2-472T-09300	Lug	1
A10	See Page 8	Cartridge Assy	1

EXPLODED VIEW (ARM)

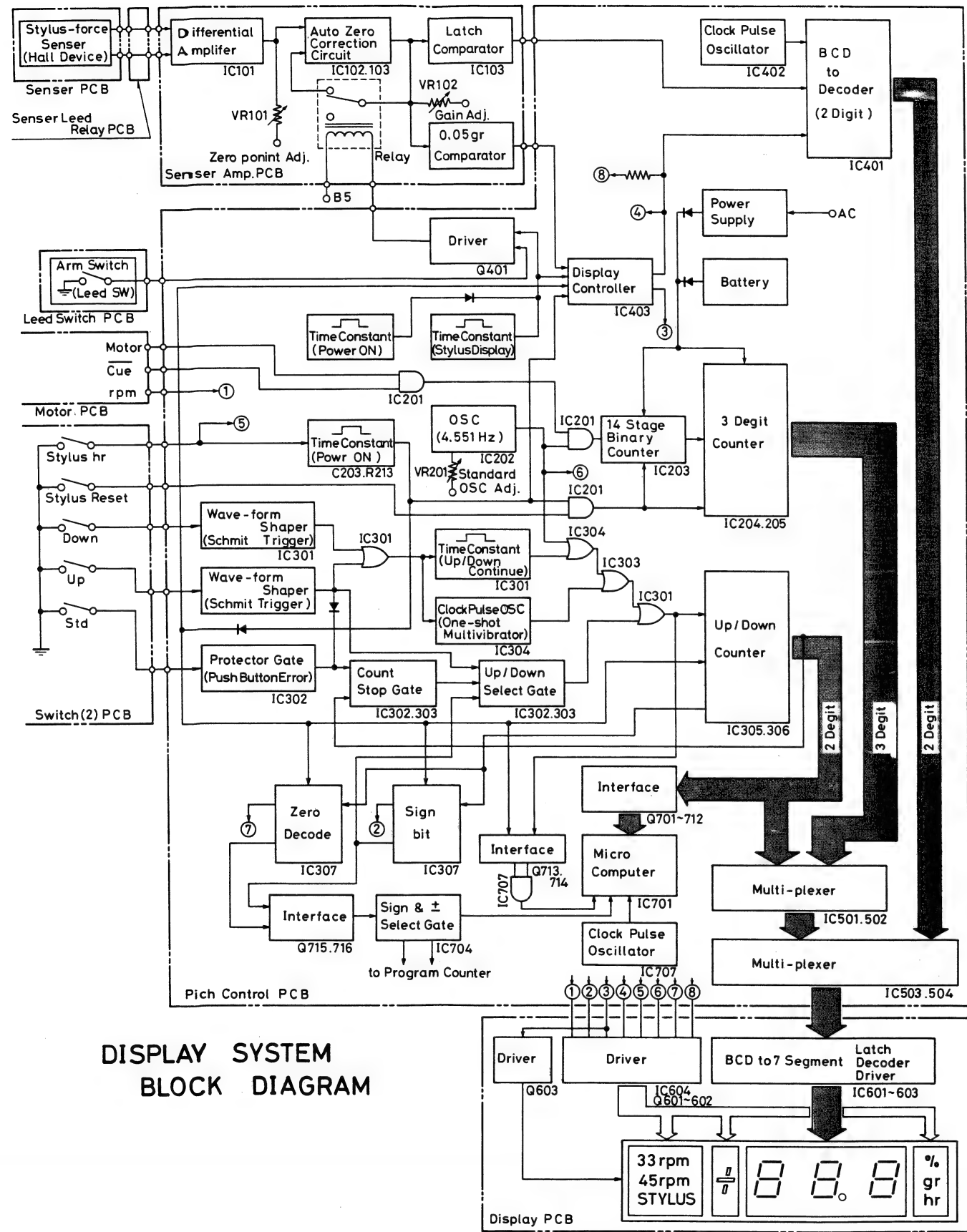


EXPLODED VIEW (MECHANISM)

Key No.	Part No.	Description	Q'ty
MECHANISM			
M1	141-0-311T-28701	Chassis Ass'y	1
M2	141-0-742T-15801	Lever Ass'y	1
M3	141-0-742T-43300	Lever Ass'y	1
M4	141-2-683T-36000	Ring	1
M5	141-2-453T-30202	Washer 2.6 x 4.7 x 0.5 Nylon	1
M6	141-2-421T-26500	Special Screw	1
M7	141-2-855T-30900	Spring Coil	1
M8	141-2-742T-25500	Lever	1
M9	141-2-855T-31000	Spring Coil	1
M10	141-2-457T-23000	Special Washer	10
M11	141-2-742T-16000	Lever	1
M12	141-2-853T-55900	Spring Plate	1
M13	141-2-457T-23100	Special Washer	6
M14	141-2-742T-16100	Lever	1
M15	141-2-851T-56100	Spring Coil	1
M16	141-2-712T-02500	Brake Shoe	1
M17	141-2-852T-55600	Spring Wire	1
M18	141-2-853T-56100	Spring Plate	1
M19	141-2-742T-17200	Lever	1
M20	141-2-853T-56001	Spring Plate	1
M21	141-0-731T-59700	Slide Ass'y	1
M22	141-0-581T-11201	Gear Ass'y	1
M23	141-2-581T-11300	Gear	2
M24	141-2-661T-26700	Pulley	1
M25	141-2-457T-04100	Special Washer	3
M26	141-2-564T-18600	Square Belt	1
M27	141-2-661T-72201	Pulley Motor	1
M28	141-2-464T-20600	Fixer	5
M29	4-527T-12500	Motor	1
M30	141-2-445T-11801	Rubber Cushion	2
M31	141-2-421T-16000	Special Screw	2
M32	141-2-457T-23900	Special Washer	1
M33	141-2-445T-22100	Rubber Cushion	2
M34	141-0-742T-43600	Lever Ass'y	1
M35	141-2-465T-17200	Stopper	1
M36	141-0-742T-43400	Lever Ass'y	1
M37	141-2-457T-23200	Special Washer	1
M38	141-2-742T-17300	Lever	1
M39	141-2-742T-17400	Lever	1
M40	141-2-853T-56400	Spring Plate	1
M41	141-0-742T-51800	Lever Ass'y	1
M42	141-2-851T-73501	Spring Coil	1
M43	141-0-742T-43500	Lever Ass'y	1
M44	141-0-747T-19000	Bracket Lever Ass'y	1
M45	141-0-742T-50500	Lever Ass'y	1
M46	141-2-490T-04600	Tube	1
M47	141-2-855T-57700	Spring Coil	1
M48	4-231T-83100	Switch, Muting	1
M49	4-231T-83200	Switch, Start	1
M50	4-231T-83300	Switch, Cat Lock	1
M51	4-238T-09600	Switch, Motor	1
M52	141-2-310T-32100	Bracket	1
M53	4-264T-08300	Magnetic Coil	2
M54	141-2-855T-47500	Spring Coil	1
M55	141-2-310T-32200	Bracket	1
M56	4-264T-09200	Magnetic Coil	1
M57	141-2-488T-01302	Pin	1
M58	141-2-581T-11301	Lever	1
M59	141-2-742T-43900	Lever	1
M60	141-0-742T-44000	Lever Ass'y	1
M61	141-2-855T-57600	Spring Coil	1
M62	141-2-465T-17300	Stopper	1
M63	141-0-747T-19100	Bracket Lever Ass'y	1
M64	141-2-742T-45400	Lever	1
M65	141-2-855T-47700	Spring Coil	1
M66		Diode 1N4003 (D817)	1
M67	141-2-855T-57500	Spring Coil	1
M68	141-2-742T-50300	Lever, Lift up Lever	1
M69	141-0-742T-50400	Lever Ass'y	1
M70	141-2-447T-68200	Cushion	1
M71	141-2-352T-44700	Spacer	1
M72	141-2-464T-08700	Fixer	2
M73	141-2-490T-02700	Tube 6.5mm	1
M74	141-2-351T-52700	Bracket Mounting	1
M75	141-2-765T-02100	Magnet	1
M76	141-2-352T-44600	Spacer	1



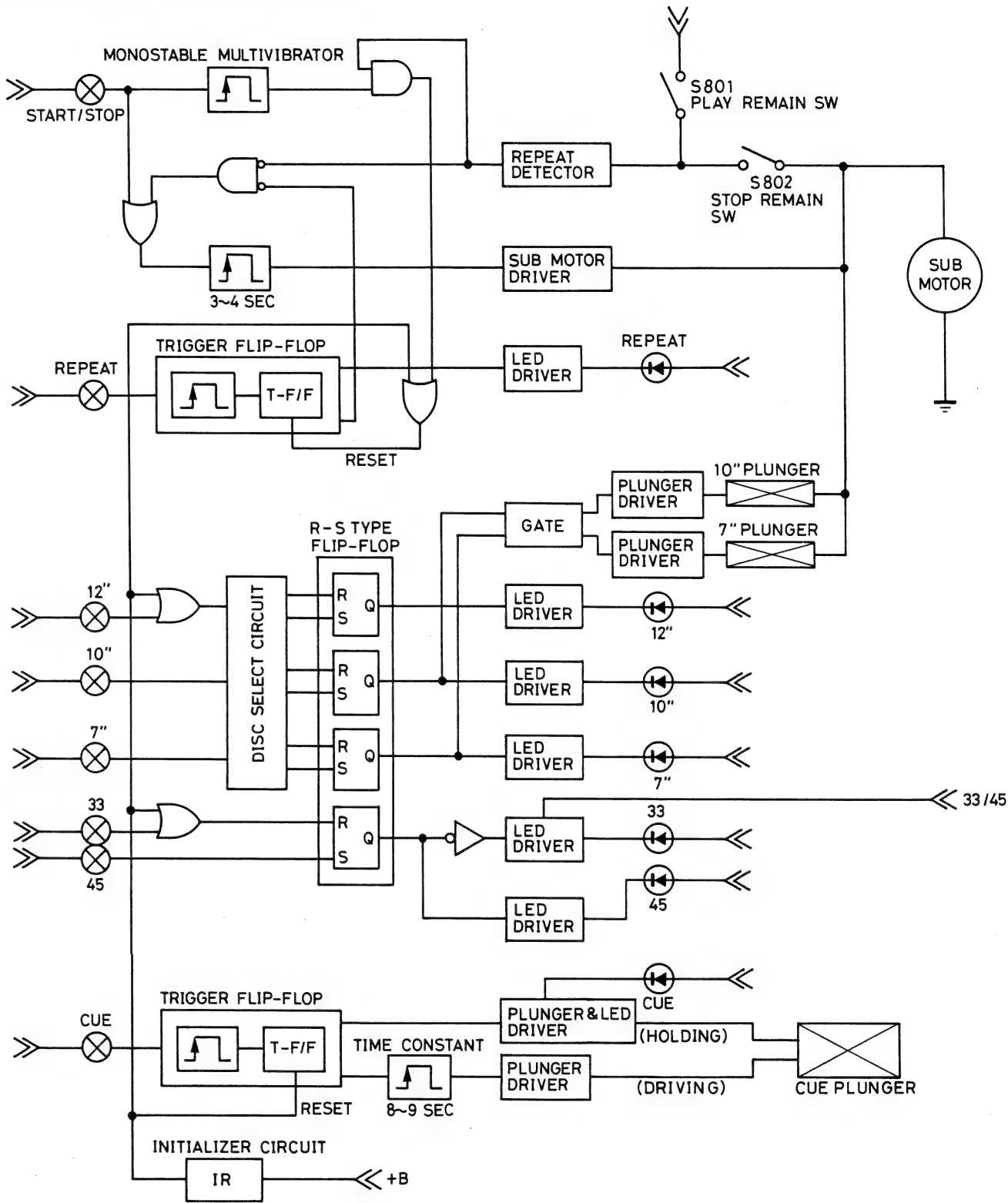
DISPLAY SYSTEM BLOCK DIAGRAM



DISPLAY SYSTEM
BLOCK DIAGRAM

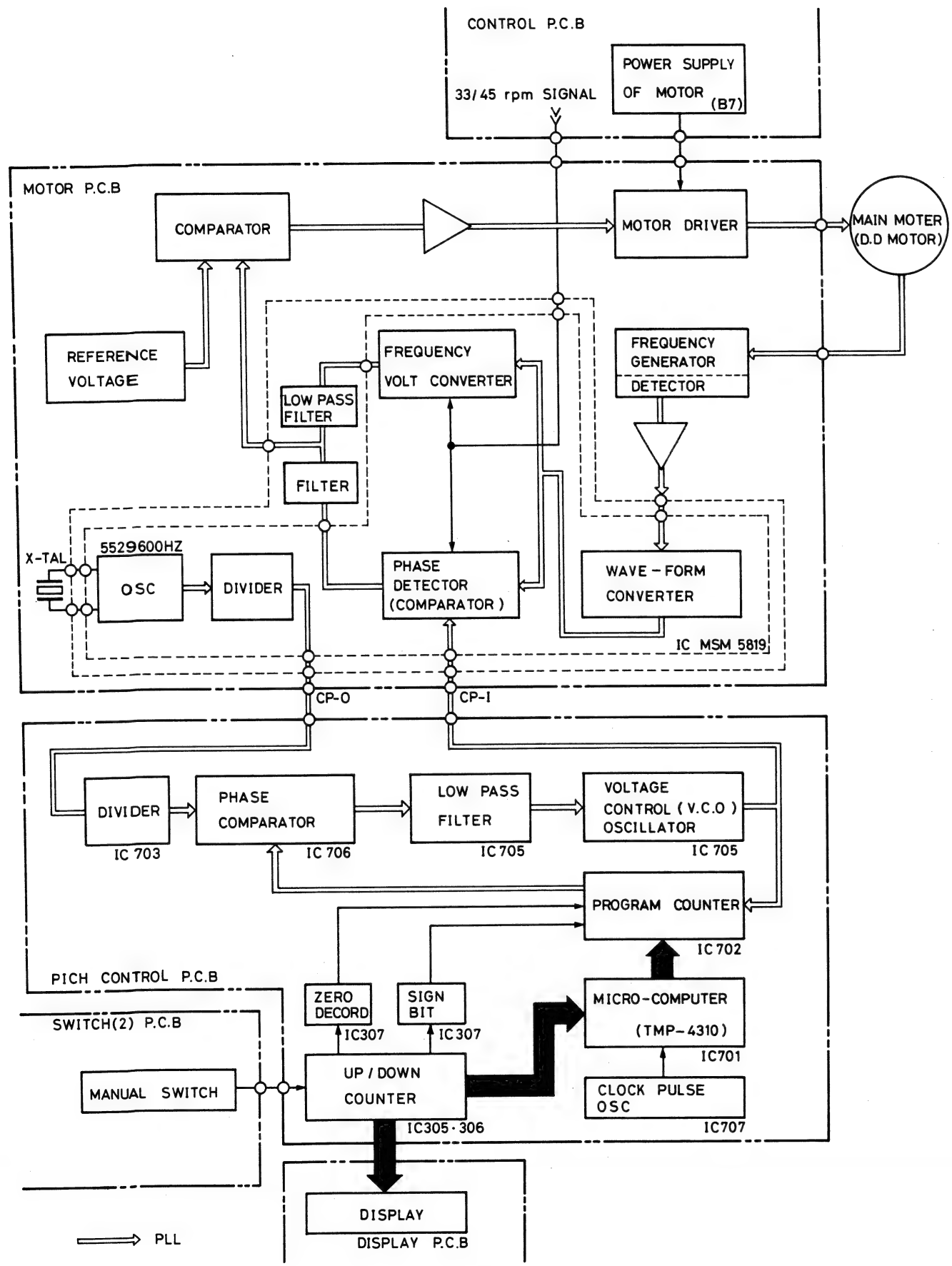
BLOCK DIAGRAM

MECHANISM CONTROL CIRCUIT



BLOCK DIAGRAM

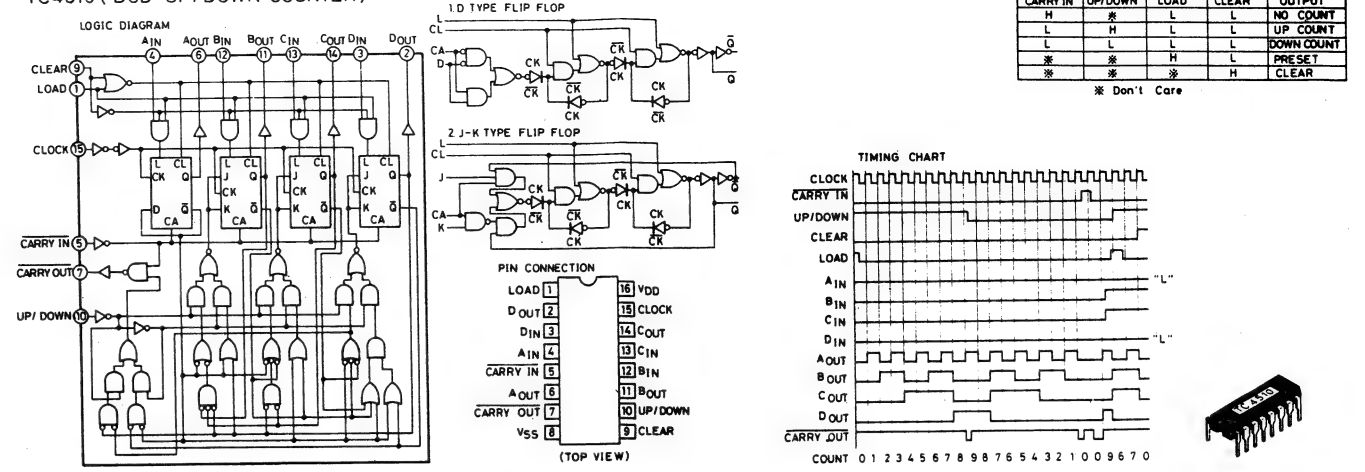
MOTOR CONTROL (PICH & PLL) SYSTEM DIAGRAM



IC BLOCK DIAGRAM

TC 4510

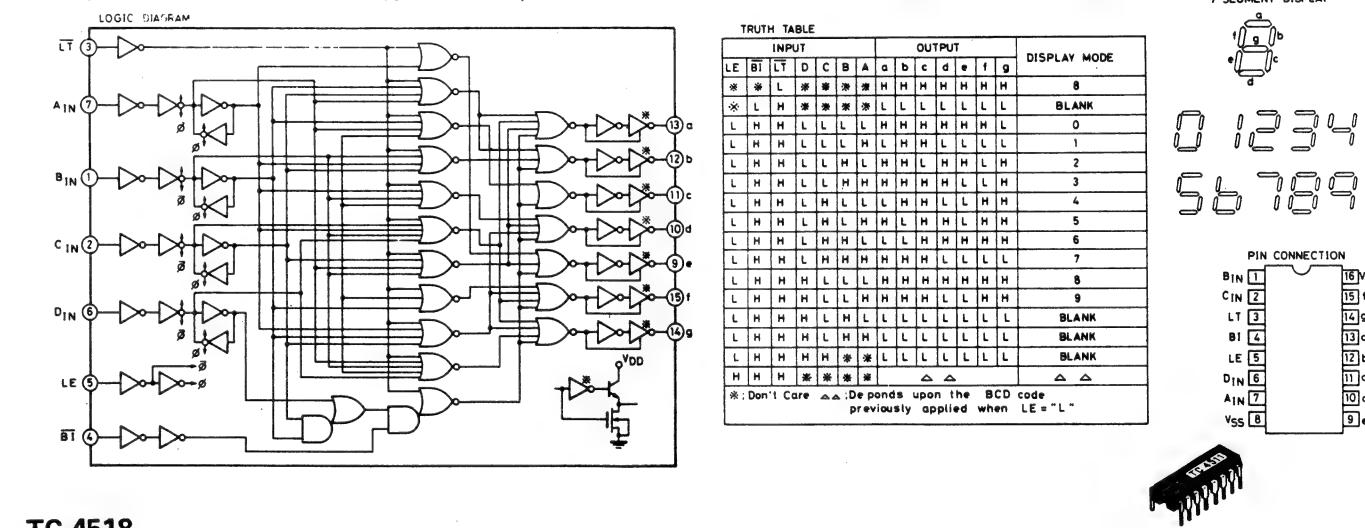
TC4510 (BCD UP/DOWN COUNTER)



TC 4511

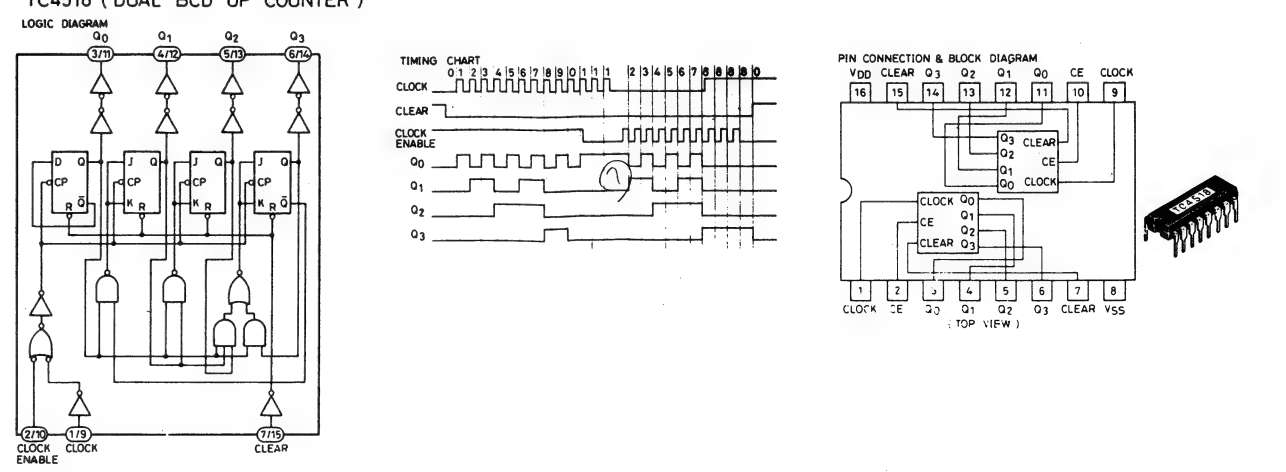
TC4511 (BCD TO 7-SEGMENT LATCH/DECODER/DRIVER)

TC4511 (BCD TO 7-SEGMENT LATCH/DECODER/DRIVER) 7-SEGMENT DISPLAY

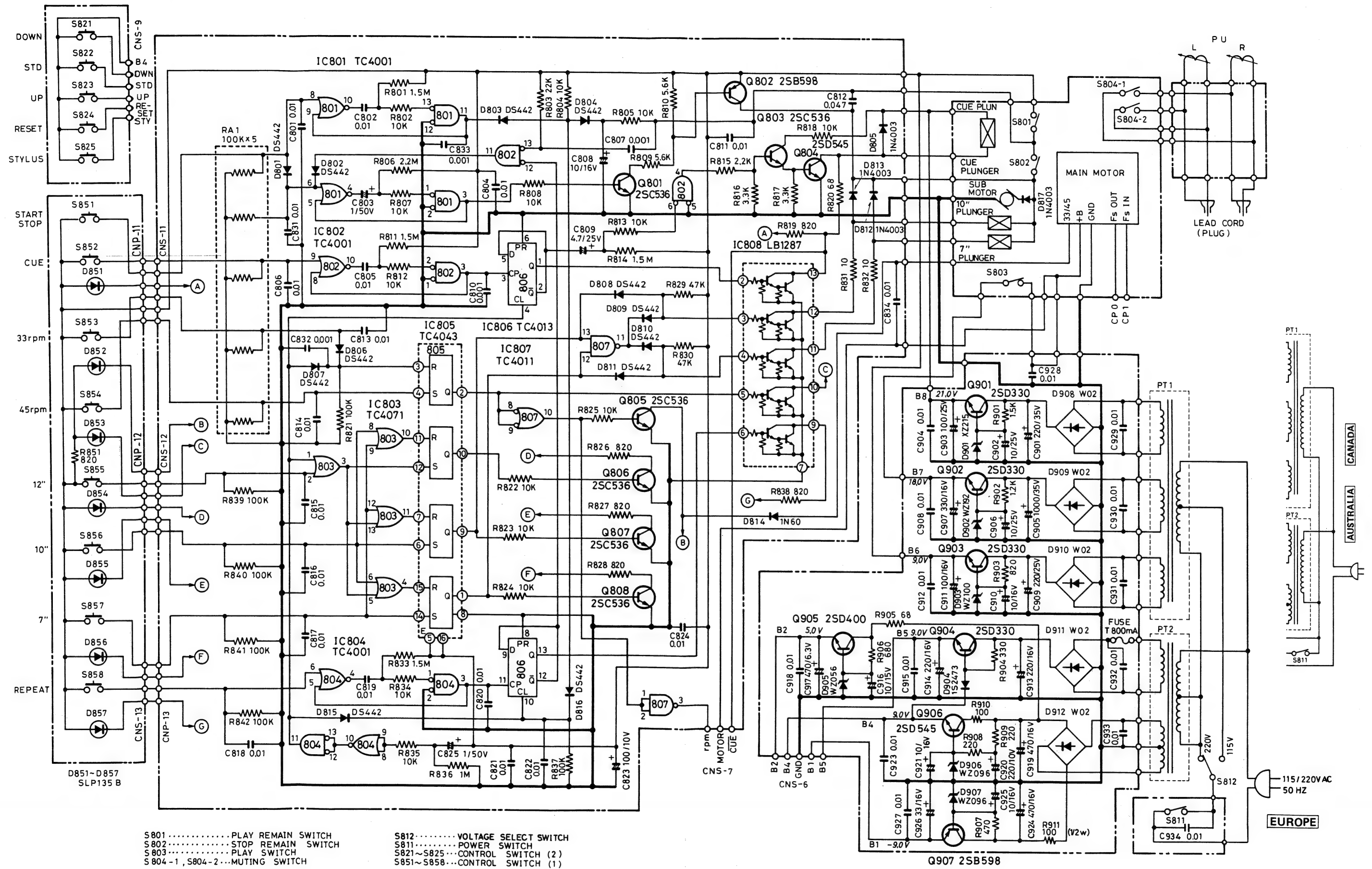


TC 4518

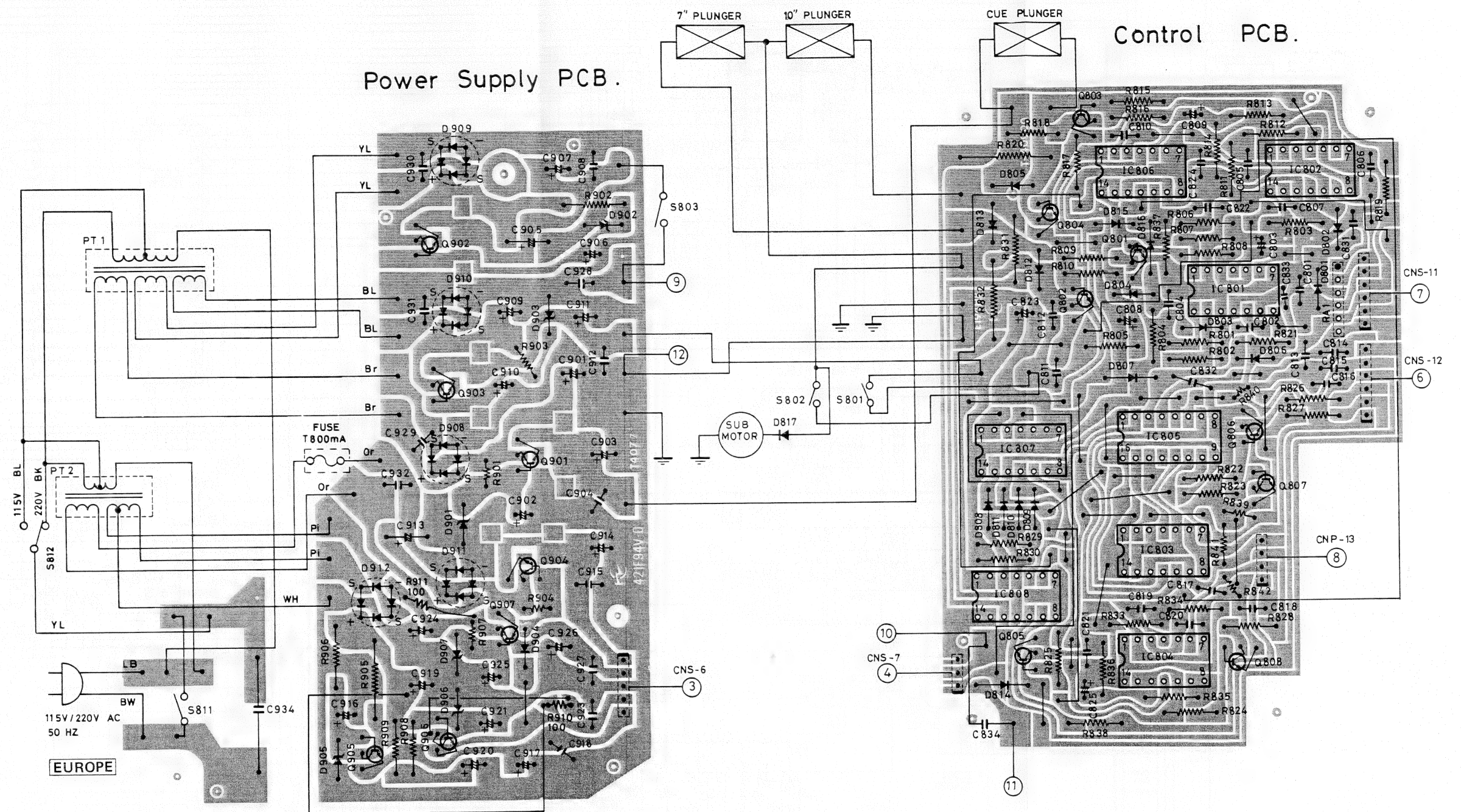
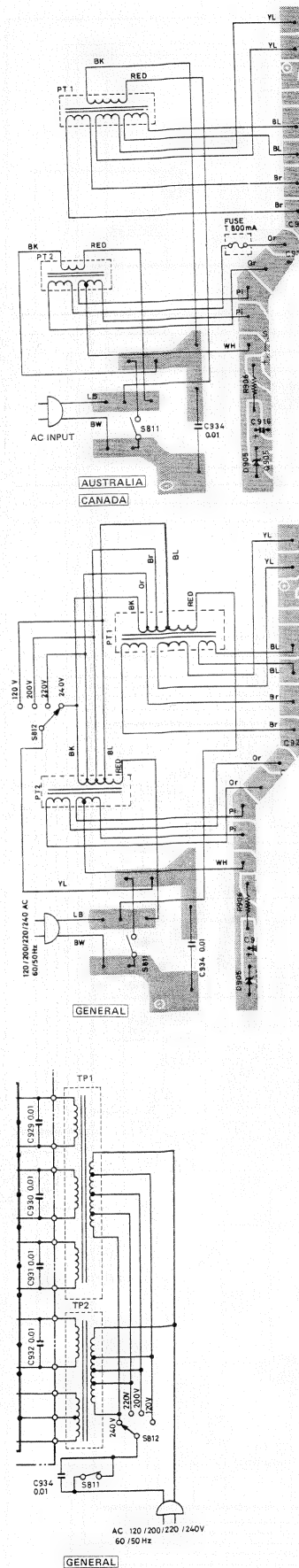
TC4518 (DUAL BCD UP COUNTER)



SCHEMATIC DIAGRAM (CONTROL)



WIRING DIAGRAM (CONTROL, POWER SUPPLY)



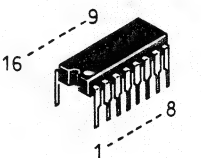
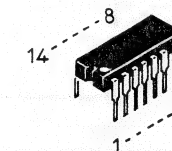
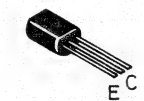
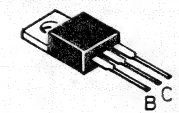
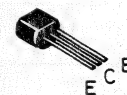
2SC536 --- Q801, Q803
Q805 ~ Q808
2SB598 --- Q802, Q907
2SD545 --- Q804, Q906

2SD330 --- Q901 ~ Q904

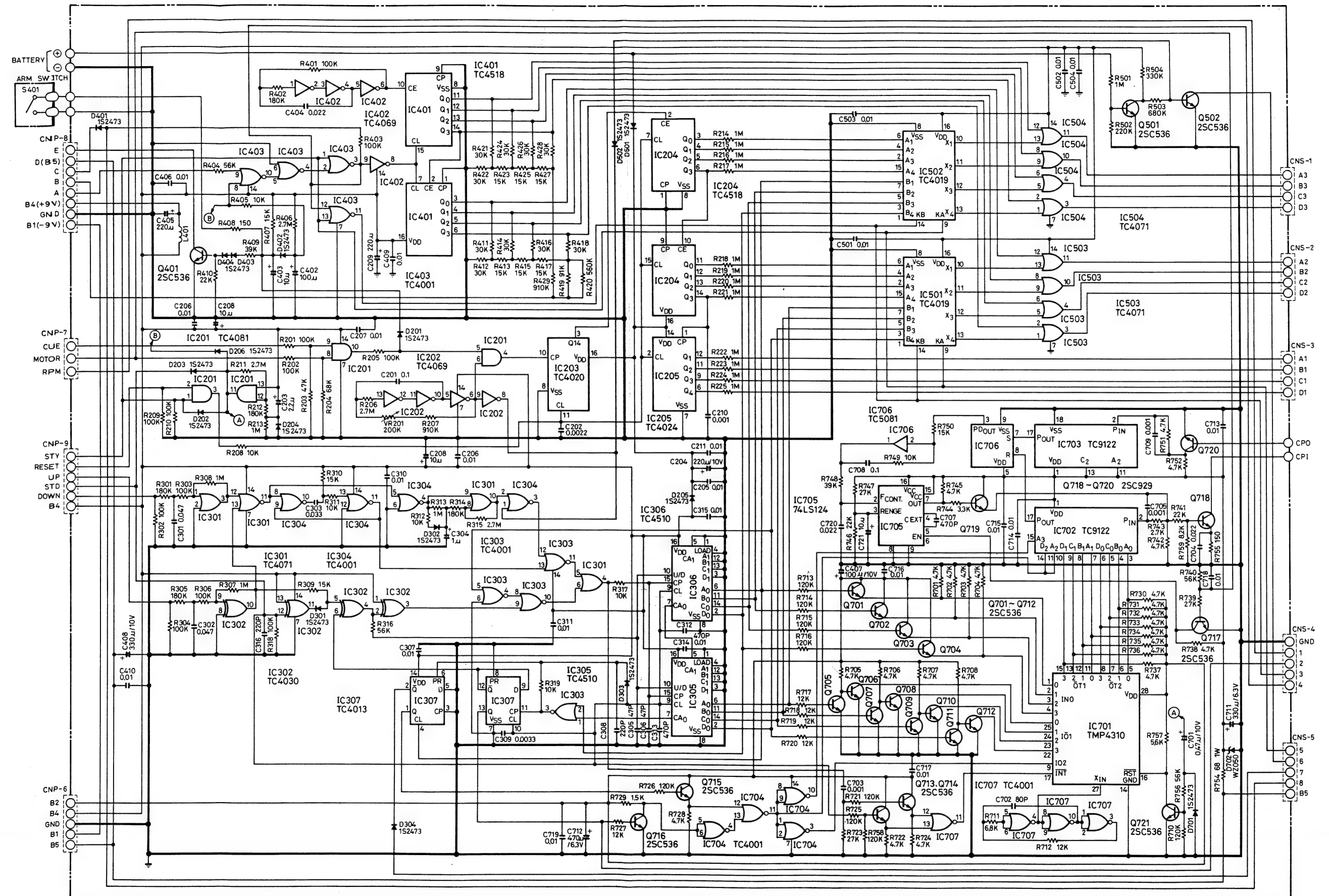
2SD440 --- Q905

TC4001 --- IC801, IC802, IC804
TC4071 --- IC803
TC4013 --- IC806
TC4011 --- IC807
LB1287 --- IC808

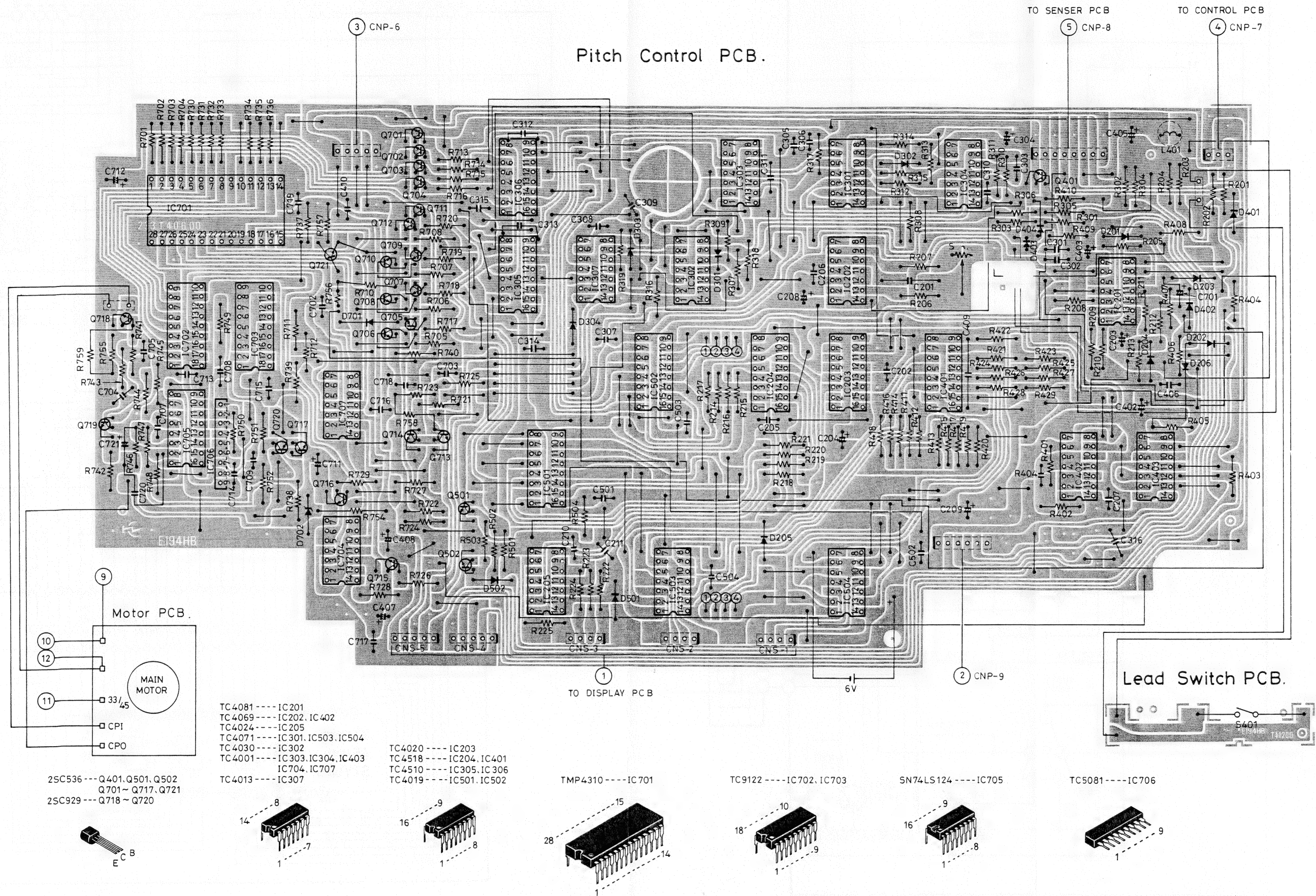
TC4043 --- IC805



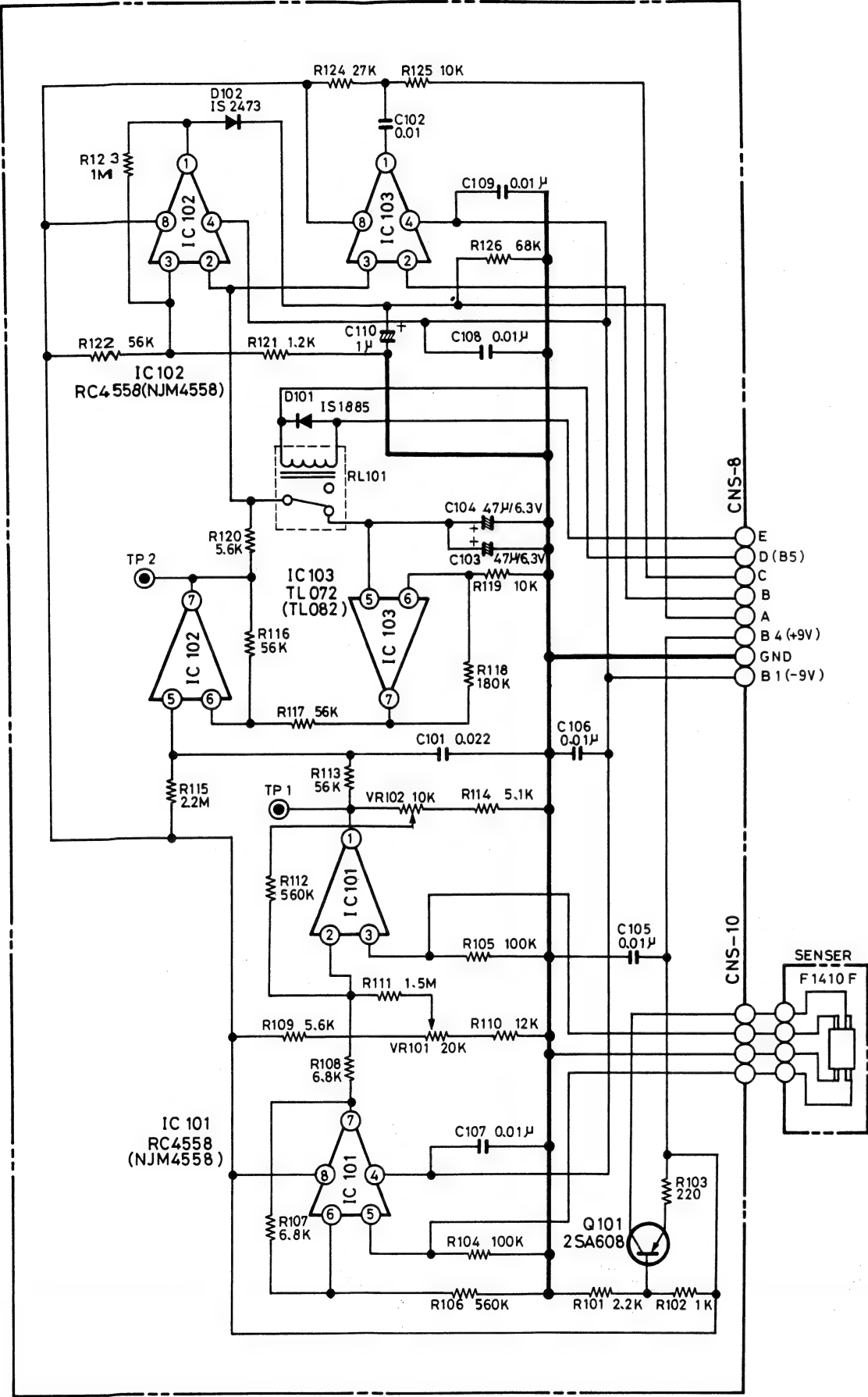
SCHEMATIC DIAGRAM (PITCH CONTROL)



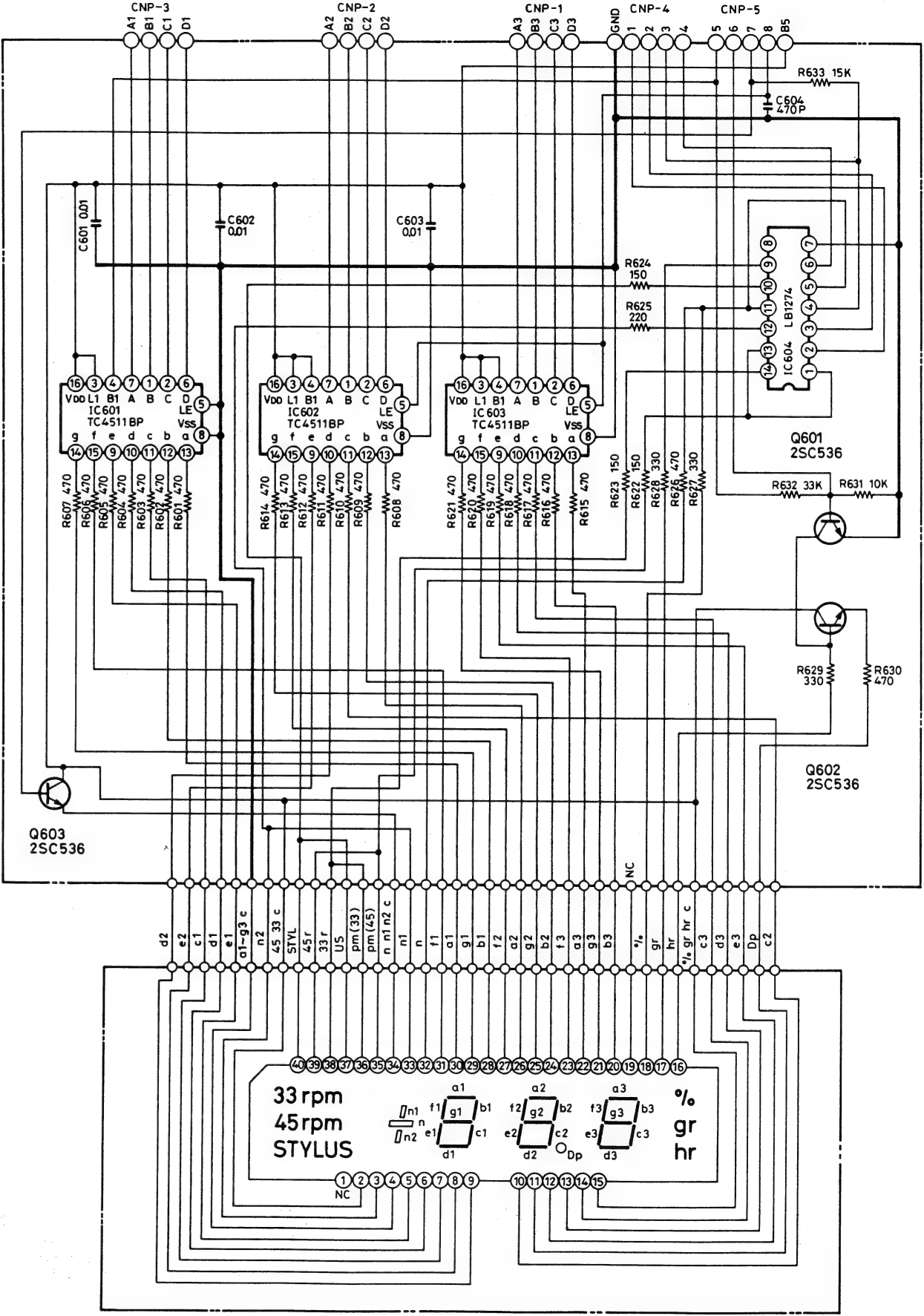
WIRING DIAGRAM (PITCH CONTROL)



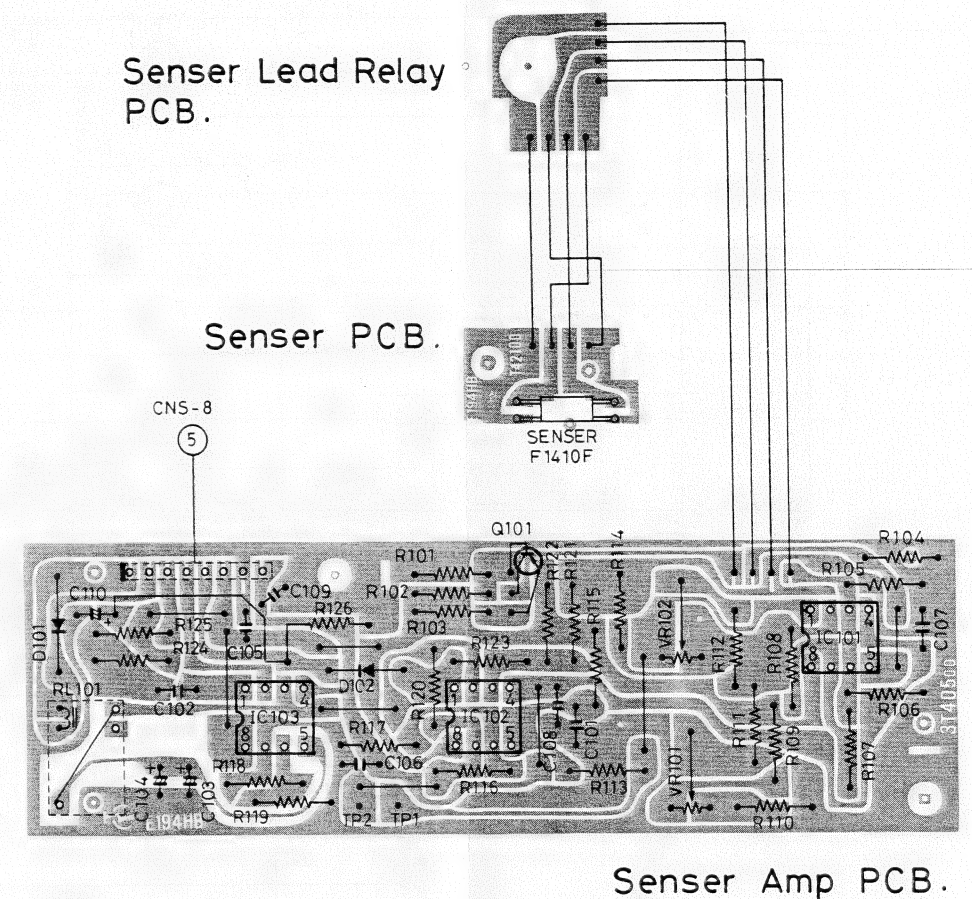
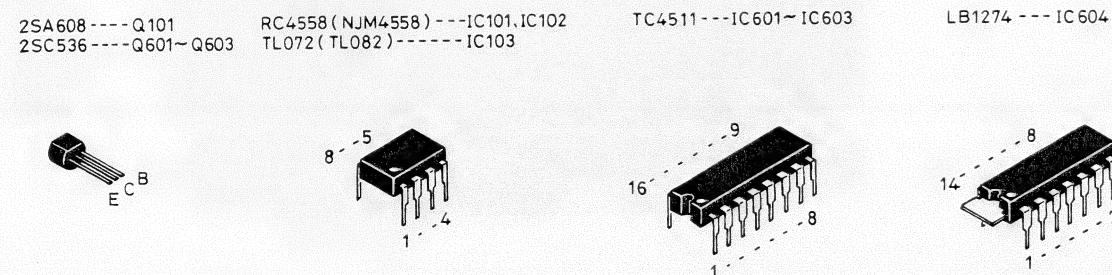
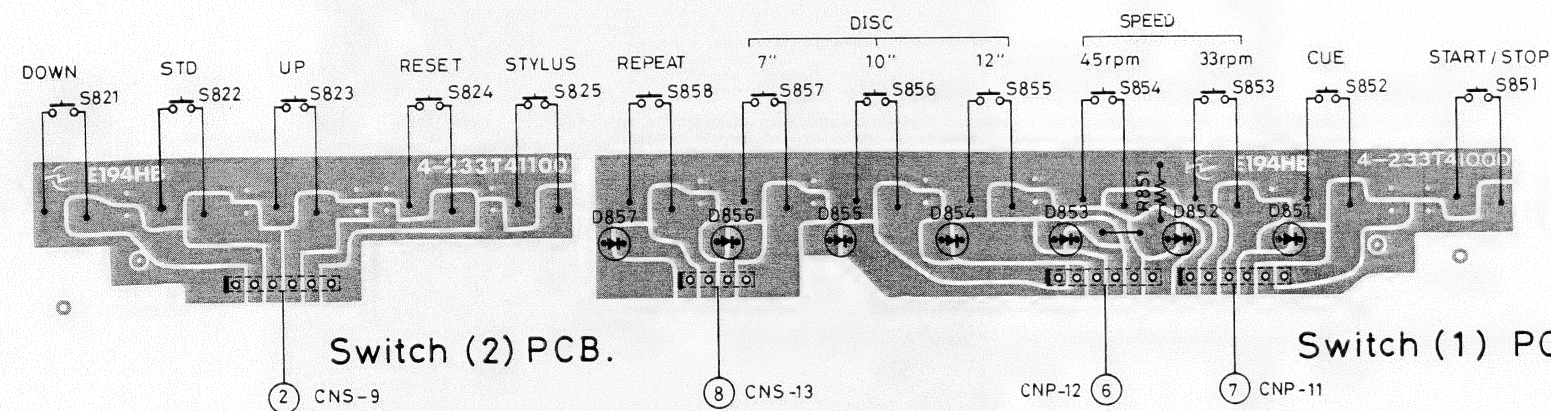
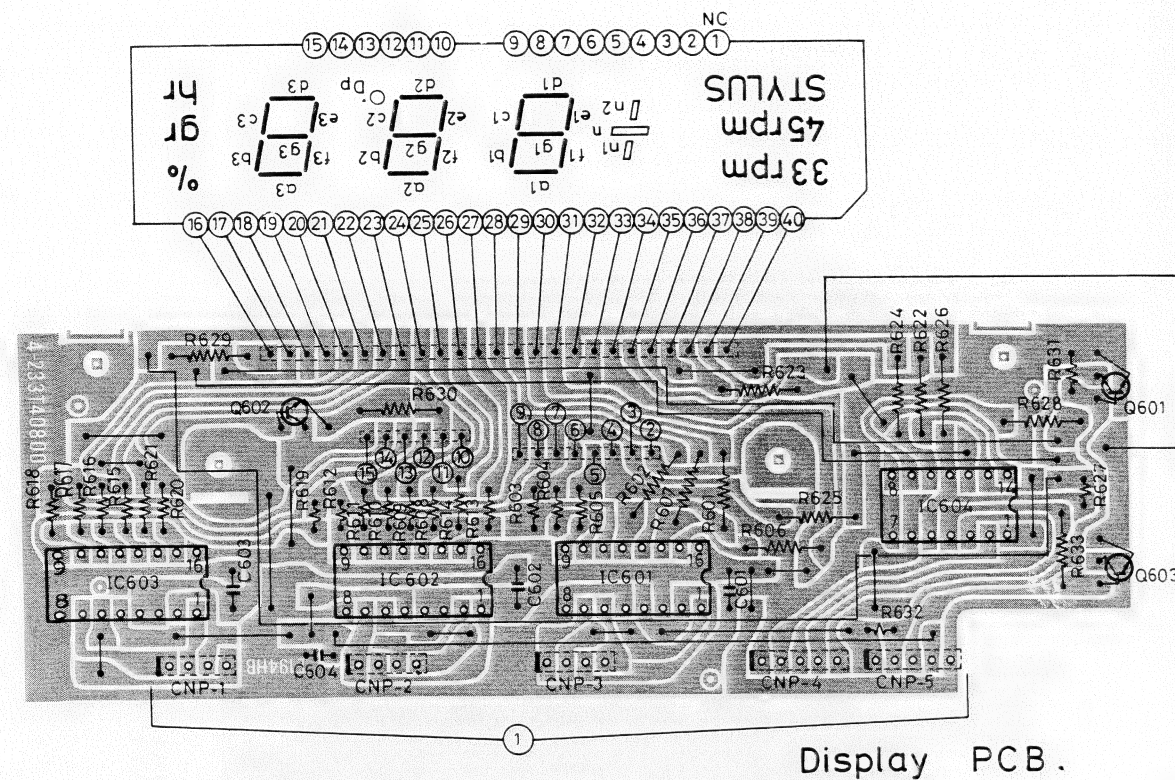
SCHEMATIC DIAGRAM (SENSOR AMP.)



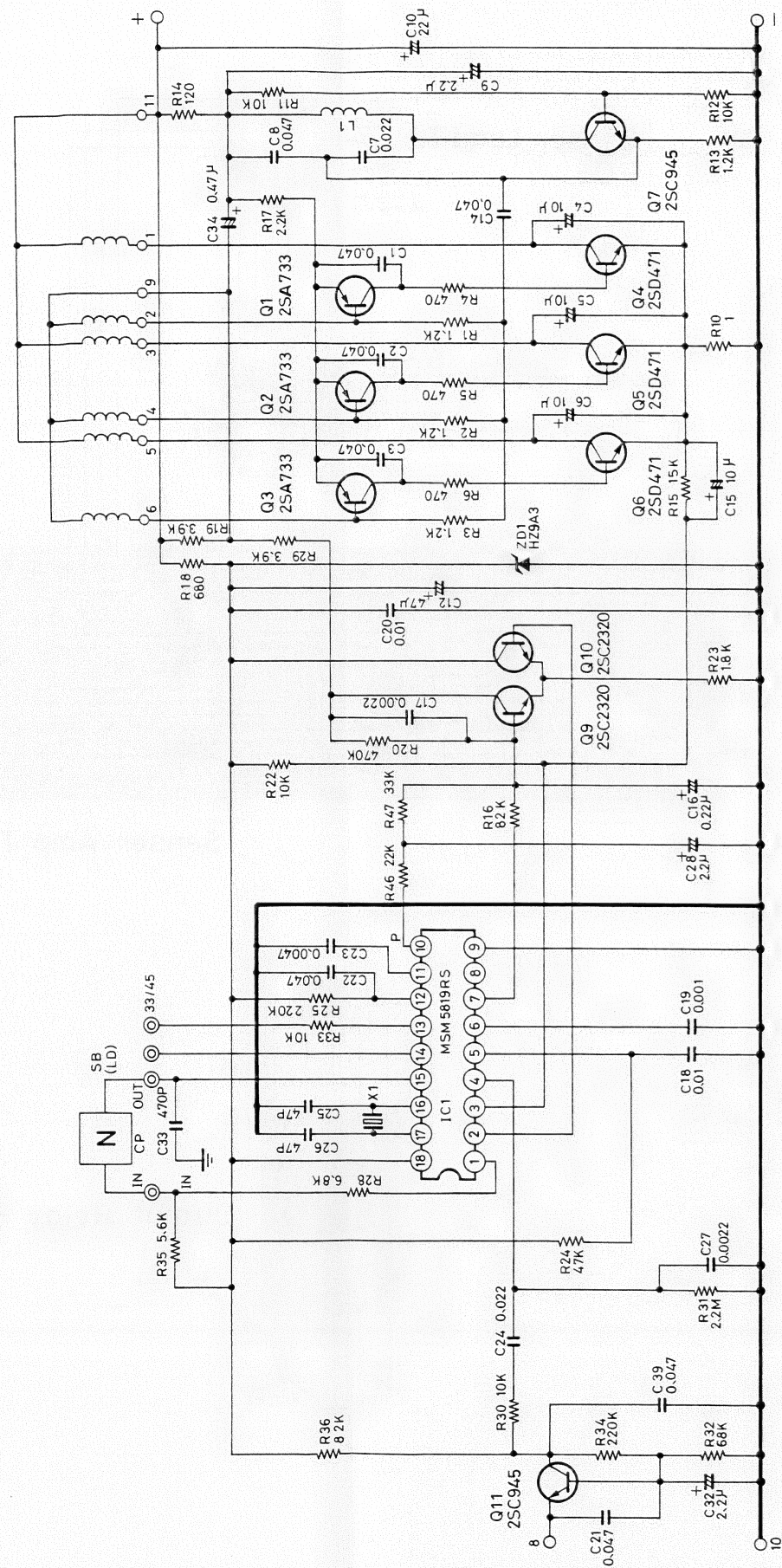
SCHEMATIC DIAGRAM (DISPLAY)



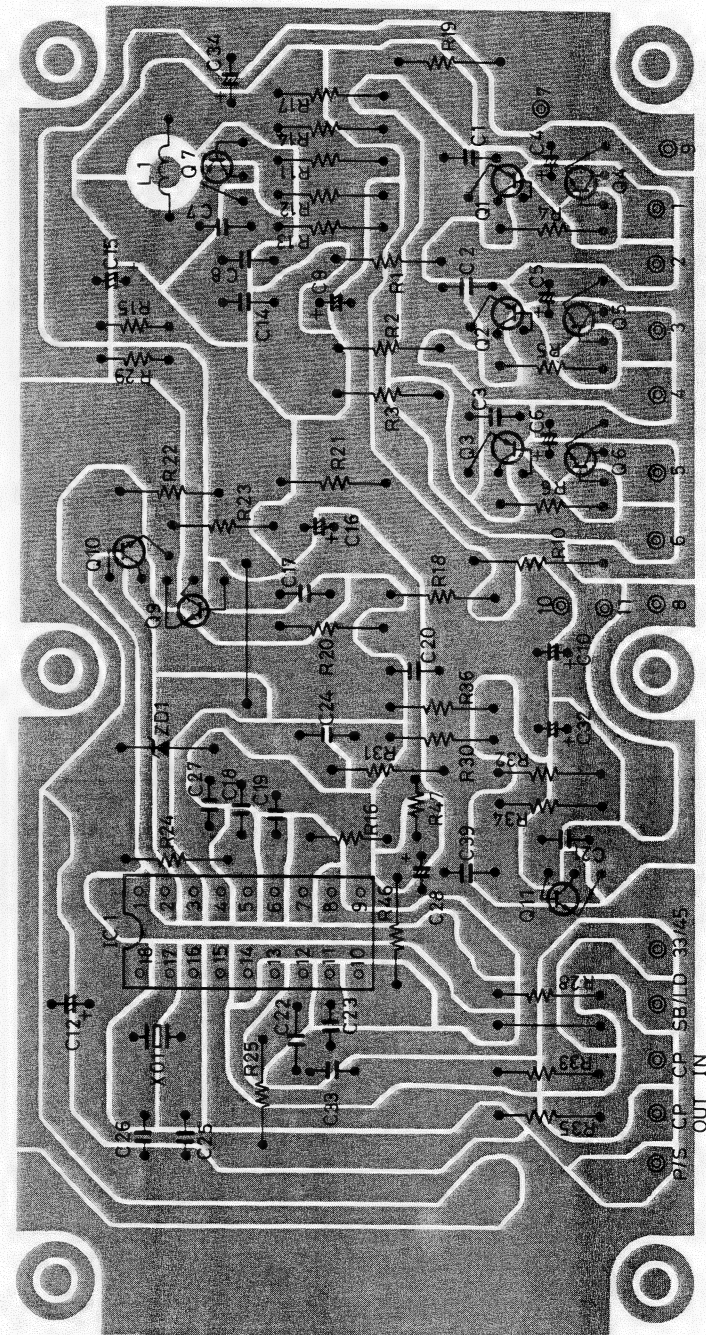
WIRING DIAGRAM (SENSOR AMP. · DISPLAY)



SCHEMATIC DIAGRAM (MOTOR)

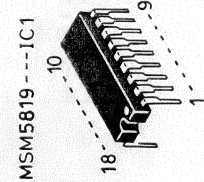


WIRING DIAGRAM (MOTOR)



Moter PCB.

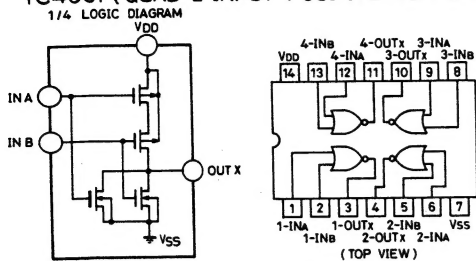
2SA733 --- Q1,Q2,Q3
2SD471 --- Q4,Q5,Q6
2SC945 --- Q7,Q11
2SC2320 --- Q9,Q10



IC BLOCK DIAGRAM

TC 4001

TC4001 (QUAD 2-INPUT POSITIVE NOR GATE)



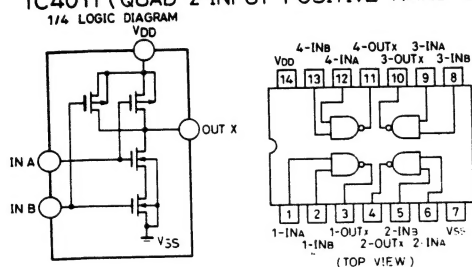
TRUTH VALUE TABLE

INPUT	OUTPUT
A B X	
L L H	
L H L	
H L L	
H H L	



TC 4011

TC4011 (QUAD 2-INPUT POSITIVE NAND GATE)



TRUTH VALUE TABLE

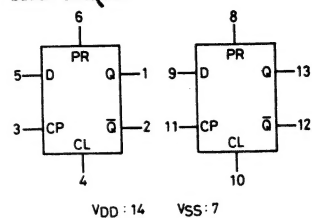
INPUT	OUTPUT
A B X	
L L H	
L H H	
H L H	
H H L	



TC 4013

TC4013 (DUAL D-TYPE FLIP FLOP)

BLOCK DIAGRAM

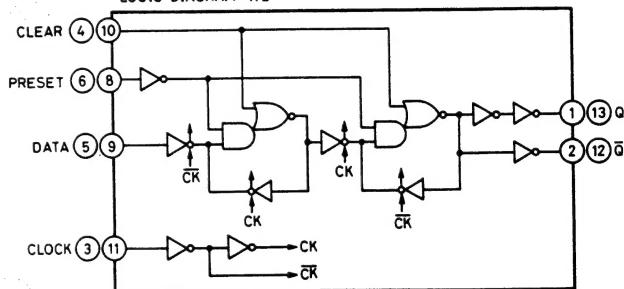


TRUTH TABLE

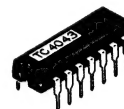
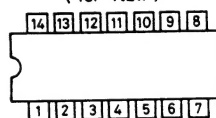
INPUTS				OUTPUTS	
CL	PR	D	CP	Qn+1	Qn+1
L	H	*	*	H	L
H	L	*	*	L	H
H	H	*	*	L	H
L	L	L	↓	L	H
L	L	H	↓	H	L
L	L	*	↑	Qn	Qn

※: DON'T CARE
 ▲: LEVEL CHANGE
 •: NO CHANGE

LOGIC DIAGRAM 1/2

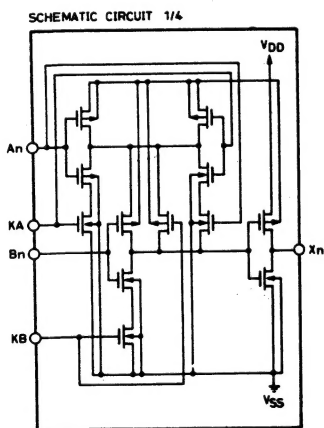


(TOP VIEW)

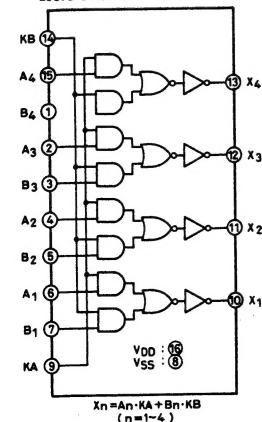


TC 4019

TC4019 (QUAD AND-OR SELECT GATE)



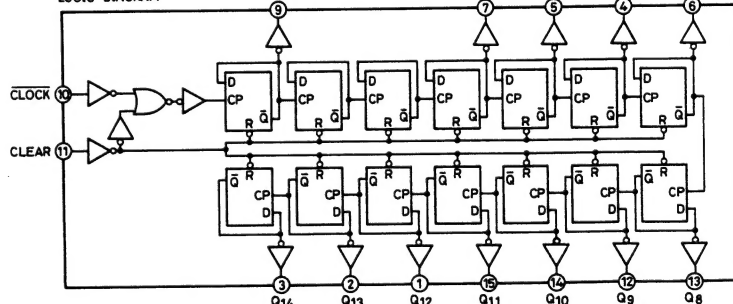
LOGIC DIAGRAM



TC 4020

TC4020 (14-STAGE BINARY COUNTER)

LOGIC DIAGRAM



PIN CONNECTION

Q12	1	16	VDD
Q13	2	15	Q11
Q14	3	14	Q10
Q6	4	13	Q8
Q5	5	12	Q9
Q7	6	11	CLEAR
Q4	7	10	CLOCK
VSS	8	9	Q1

(TOP VIEW)

TRUTH TABLE

CLOCK	CLEAR	OUTPUT STATE
*	H	All Outputs="L"
↓	L	No Change
↑	L	Advance to Next State

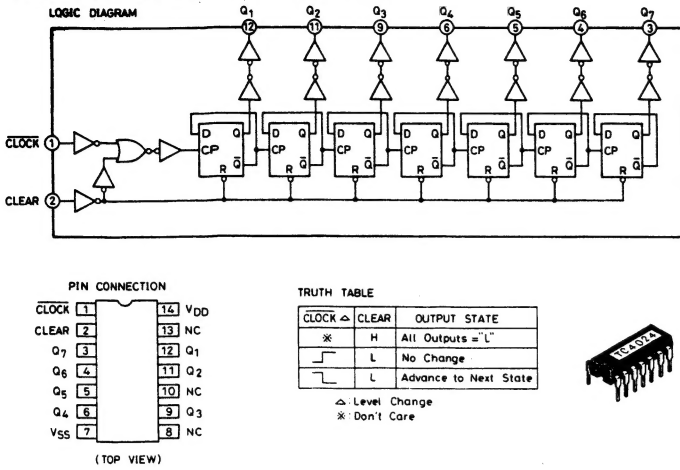
▲: Level Change
 ※: Don't Care



IC BLOCK DIAGRAM

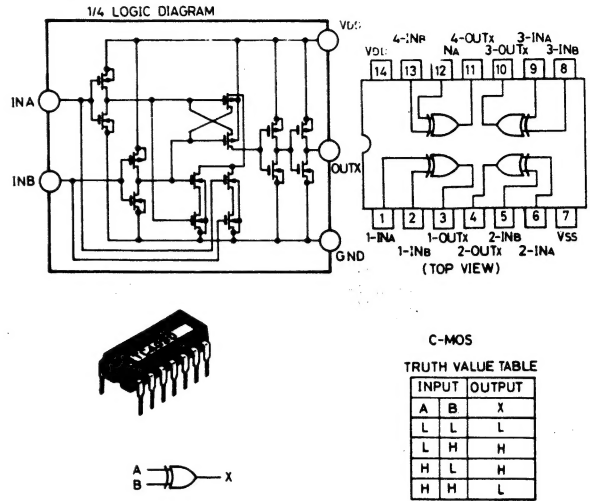
TC 4024

TC4024 (7-STAGE BINARY COUNTER)



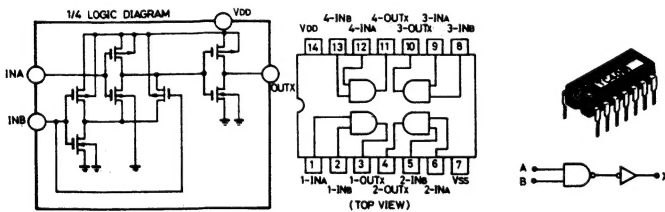
TC 4030

TC4030 (QUAD 2-INPUT EXCLUSIVE OR GATE)



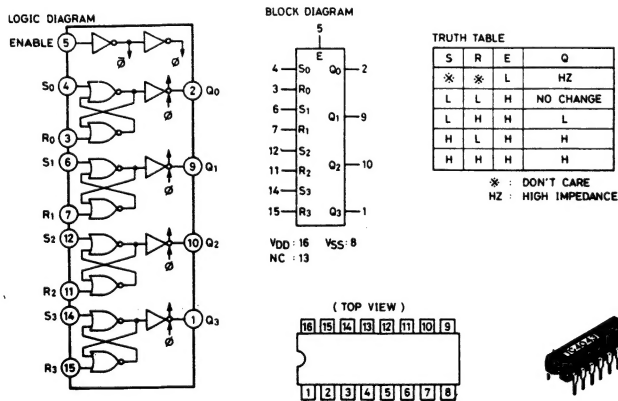
TC 4081

TC4081 (QUAD 2-INPUT POSITIVE AND GATE)



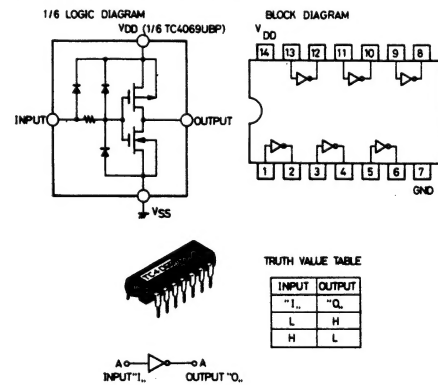
TC 4043

TC4043BP (QUAD POSITIVE NOR R/S LATCH)



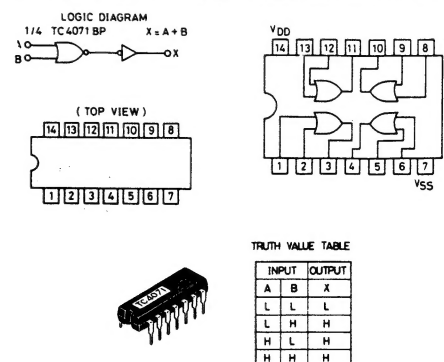
TC 4069

TC4069 (HEX INVERTER)



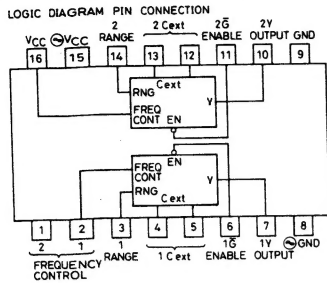
TC 4071

TC4071BP (QUAD 2-INPUT POSITIVE OR GATE)

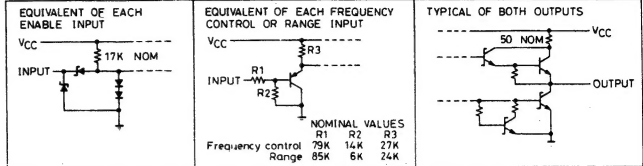


IC BLOCK DIAGRAM
SM 74LS124

SN74LS124 (DUAL VOLTAGE- CONTROLLED OSCILLATOR)

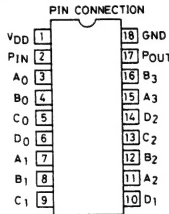
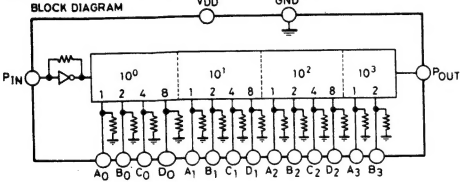


SCHEMATICS OF INPUT and OUTPUT

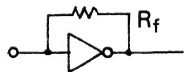
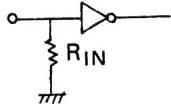


TC 9122

TC9122(HIGH SPEED BCD PROGRAM-COUNTER/DIVIDER)

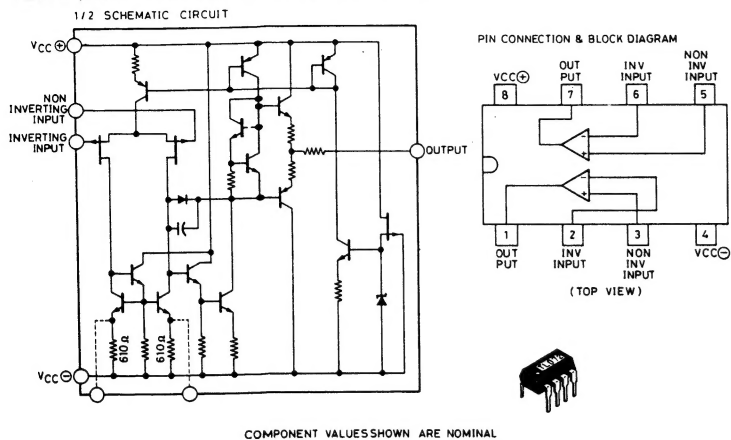


Function of each terminal

Pin No.	Symbol	Name	Function	Remarks																																																																																																																
2	P _{IN}	Programmable counter input terminal.	Input terminal of signal to be divided down in programmable counter	Amplifier built in. 																																																																																																																
3~16	A ₀ ~D ₀ A ₁ ~D ₁ A ₂ ~D ₂ A ₃ , B ₃	$\times 10^0$ $\times 10^1$ Program input terminal $\times 10^2$ $\times 10^3$	Since self-bias amplifier is built in, input can be fed by capacitor coupling, permitting operation with small signal. Input terminals to set dividing ratio N in BCD. Possible up to 8 to 3999 in 3-1/2 dividing ratio are prohibited. The following combinations of dividing ratio are prohibited. <table><tr><td>A₀</td><td>B₀</td><td>C₀</td><td>D₀</td><td>A₁</td><td>B₁</td><td>C₁</td><td>D₁</td><td>A₂</td><td>B₂</td><td>C₂</td><td>D₂</td><td>A₃</td><td>B₃</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>	A ₀	B ₀	C ₀	D ₀	A ₁	B ₁	C ₁	D ₁	A ₂	B ₂	C ₂	D ₂	A ₃	B ₃	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	Pull-down resistance is built in each terminal. 
A ₀	B ₀	C ₀	D ₀	A ₁	B ₁	C ₁	D ₁	A ₂	B ₂	C ₂	D ₂	A ₃	B ₃																																																																																																							
1	0	0	0	0	0	0	0	0	0	0	0	0	0																																																																																																							
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1	1	1	0	0	0	0	0	0	0	0	0	0	0																																																																																																							
17	P _{OUT}	Programmable counter output terminal	Output terminal of programmable counter. To be output of frequency of 1/N of P _{IN} input frequency.																																																																																																																	
1,18	V _{DD} GND		Terminals to which supply voltage is applied.																																																																																																																	

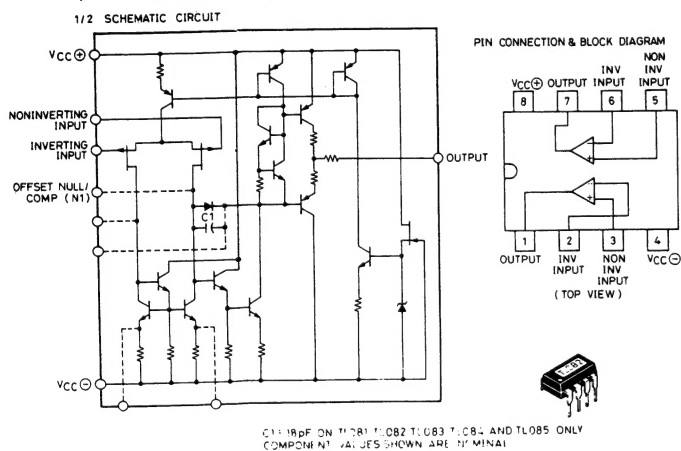
TL 072

TL072 (LOW-NOISE JFET-INPUT OPERATIONAL AMPLIFIER)



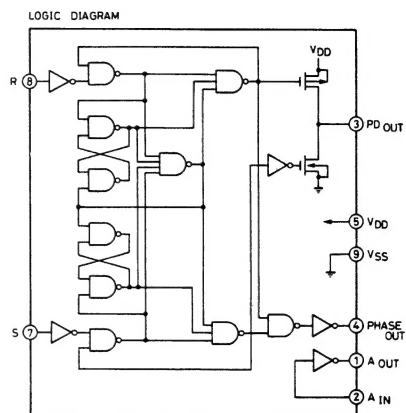
TL 082

TL082 (JFET-INPUT OPERATIONAL AMPLIFIER)

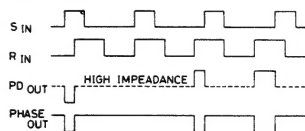


TC 5081

TC5081 (PHASE COMPARATOR)

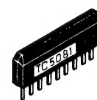


TIMING CHART



PIN CONNECTION

9	GND
8	R
7	S
6	NC
5	VDD
4	PHASE OUT
3	PD OUT
2	A IN
1	A OUT



SANYO ELECTRIC TRADING CO., LTD.
33, Hiyoshi-cho 2, Moriguchi-shi
Osaka-fu, 570, JAPAN

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